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# USSR Report

## SCIENCE AND TECHNOLOGY POLICY

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SCIENCE AND TECHNOLOGY POLICY**

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## NORMATIVE PROFIT DISTRIBUTION METHOD ADVOCATED

Moscow FINANSY SSSR in Russian No 12, Dec 83 pp 22-25

[Article by K.M. Cherkasova, deputy section chief in the USSR Ministry of Finance: "Profit Distribution Problems in the Machine-Building Branches"]

[Text] Continued improvement of the economic system depends upon enhancing the balance of set plans and increasing the role of economic accountability, economic levers and incentives.

For several years seven machine-building ministries have been using the normative method for distributing profits, and the Ministry of Chemical and Petroleum Machine Building joined them in 1983.

The method involves linking the profit distribution system with assignments for the five-year period, and increasing the economic responsibility of the ministries, industrial associations and enterprises for the results of their finance and management work, and their incentive to make more effective use of the material and financial resources. The size of resources left at the disposal of the ministries and of deductions into the budget are increased according to the degree of improvement in the end results. Planned payments out of profits are guaranteed. That is, if the profit plan is not fulfilled they are made entirely by correspondingly reducing the amount of profit remaining at the disposal of the ministries.

Under the new conditions the planned outlays of a branch must be covered mainly with profit and from other own sources, and with bank loans if necessary. In the Ministry of Construction, Road and Municipal Machine Building, the Ministry of the Electrical Equipment Industry and the Ministry of the Machine Tool and Tool Building Industry all planned outlays are made with own funds. Allocations are provided out of the budget for financing the construction of new enterprises and shops: up 70 percent of the investments in new construction in the Ministry of Power Machine Building and up to 30 percent in the Ministry of Tractor and Agricultural Machine Building. As production effectiveness increases, the branch's own funds and bank loans will have to be used to cover these expenditures.

The results of the work performed by the ministries converted to the normative profit distribution method for 1982 are presented in Table 1.

Table 1

Ministry	Plan fulfillmentpercentage by indicator				
	Standard output	net Sales volume	Sales volume including deliveries	Labor productivity	Overall profit
Heavy and Transport Machine Building	101.1	100.4	93.9	101.6	93.2
Power Machine Building	100.2	98.7	91.2	101.6	71.4
Construction, Road, and Municipal Machine Building	101.0	100.7	96.6	101.6	102.3
Tractor and Agricultural Machine Building	101.8	101.2	98.0	101.6	103.0
Electrical Equipment Industry	102.3	99.5	96.4	102.7	97.3
Machine Tool and Tool Building Industry	101.8	101.4	99.1	102.4	104.5
Machine Building for Animal Husbandry and Fodder Production	102.4	101.1	97.8	102.4	105.7

It is only possible to use the normative method effectively with a balanced, set plan, stable material and technical supply and the observance of technological, plan and labor discipline by all the enterprises.

The normative profit distribution method focuses on the activation of all internal economic resources in the branch, and its application requires a higher level of economic performance. The profit distribution method can only be improved if accompanied by a further improvement of planning. The orientation of the entire system of economic levers and incentives toward the five-year plan must be increased.

The ministries' experience with the application of the normative profit distribution method, however, has shown that the five-year plans have not been made the foundation of production economics. A number of ministries are not assuring the stability of yearly and quarterly plans and adjust the plans for production, labor productivity and profits without altering interrelated indicators. As a result of repeated adjustments the relative share of planned

profits for December of 1981 was 52 percent above the quarterly plan in the Ministry of Heavy and Transport Machine Building, and the profits for December of 1982 exceeded 50 percent of the quarterly plan in the Ministry of Power Machine Building. In connection with this we must point out the fact that the profit indicator in the yearly plans for the ministries, which is rated and not fixed, does not help to increase the ministries' responsibility for plan stability.

The standard deductions from profits left at the disposal of the ministries are fixed on the basis of annual financial plan indices. The stability of these standards is disturbed throughout the year by changes made in the plans for profits, capital investment volumes and other indices. The fixed standard deductions from profits to the use of the Ministry of Power Machine Building was 86 percent in 1981, for example, and the adjusted figure was 83.2. The corresponding figures for the Ministry of Heavy and Transport Machine Building were 75.3 and 77.7 percent respectively. Standard deductions from profits to the use of the Ministry of Machine Building in 1982 was set at 66.1 percent, while the figure after adjustments for new wholesale prices and rates and changes in capital investment volumes reached 83.6 percent, and the corresponding figures for the Ministry of Heavy and Transport Machine Building were 74 and 65.6 percent respectively. Getting the new profit distribution principles down to the basic level, the enterprise, is an important condition for enhancing the effectiveness of their performance.

All enterprises of the Ministry of Power Machine Building, the Ministry of Tractor and Agricultural Machine Building and the Ministry of Machine Building for Animal Husbandry and Fodder Production were converted to the new normative profit distribution method, 25 percent of the enterprises in the Ministry of Heavy and Transport Machine Building, 4 percent of those in the Ministry of Machine Tool and Tool Building Industry, and only the All-Union associations in the Ministry of the Electrical Equipment Industry.

The profit distribution standards provided the production associations and enterprises are of a formal nature to a significant degree. They have no part in interrelations with the budget, since six of the ministries, the Ministry of Machine Building for Animal Husbandry and Fodder Production being the exception, have the centralized procedure for handling transactions with the budget. The Ministry of Power Machine Building, however, while handling accounts with the budget by the centralized procedure, makes recalculations with each enterprise on the basis of the established profit distribution standard and withdraws part of their above-plan profits for the ministry's reserve. According to the statute on the procedure for distributing the profits of enterprises converted to the normative method, in the case of above-plan profit of up to 3 percent half of it is transferred to the budget. If the plan is exceeded by more than 3 percent, 25 percent of the amount is left at the disposal of the enterprises, and the remainder is designated as budget revenues.

The profit plan for the first 9 months of last year was exceeded by 13 enterprises of the Ministry of Power Machine Building, and when the ministry calculated the deductions from their profits it withdrew part of their above-plan profits, 2.4 million rubles, by the centralized procedure for financing general branch expenditures and left part of them for the enterprises themselves. The ministry as a whole failed to fulfill the profit plan for that period by 18.8 million rubles, or 12 percent, however. The ministry paid 26.6 million rubles in planned deductions to the budget, as well as another 2 million rubles out of

markups for the Emblem of Quality and deductions from the profits of scientific research institutes. This example illustrates the fact that the normative profit distribution method required decentralized calculations for payments to the budget out of profits. With the centralized calculations that ministry shorted the budget by 2.4 million rubles during the first 9 months of 1982 alone.

Enterprises which have been assigned standard deductions from the profits left at their disposal should be converted now to decentralized settlements with the budget. In the future, as all the machine-building enterprises are converted to the normative method, we believe that they should be simultaneously converted to decentralized settlements with the budget.

It should be noted that enterprises converted to the normative profit distribution method make transfers to the incentive funds for exceeding the plan from 50 percent of the above-plan profits, whereas enterprises not converted to this system make transfers on the basis of the total amount of above-plan profits.

It seems to us that above-plan profits should be distributed between the budget and the operation itself in those branches already employing the normative method after making the transfers from those profits into the incentive funds for exceeding the plan for the fund-generating indicators, with settlements with the budget made by the decentralized procedure.

In order to increase the responsibility of the enterprises for correctly indicating the results of their financial and management work, the procedure for transferring to the budget funds discovered in the process of auditing accounts should be defined somewhat more specifically. Of the ministries with centralized accounting with the budget, account audits made by finance agencies in 1982 uncovered padded production costs and a corresponding reduction in actual profits in 1981 statements: 2.1 million rubles at enterprises of the Ministry of the Electrical Equipment Industry, 2 million rubles for the Ministry of Machine Tool and Tool Building Industry, 0.8 million rubles for the Ministry of Heavy and Transport Machine Building, and 0.4 million rubles for the Ministry of Power Machine Building. The budget received these amounts.

The USSR Ministry of Finance makes the final calculation for the withdrawal of these funds when recalculating payments from profits, on the basis of a portion (according to a fixed standard) of profits left at the disposal of the ministries for the corresponding year. Under this system the budget received only part of the additional income uncovered by the finance agencies. After the recomputation most of the additional sums (70-80 percent for the Ministry of Heavy and Transport Machine Building and the Ministry of Power Machine Building) is returned to the ministry.

The transfer to the budget of additional income discovered in the auditing of accounts should be the penalty for violating the existing system for planning, accounting and reporting in the production associations and at enterprises of the ministries converted to the normative profit distribution method. Such additional income should be taken in its entirety and not on the basis of standard deductions from profits left at the branch's disposal. This would make it possible to increase payments to the budget for machine building ministries converted to the normative method by 4-5 million annually.

We feel that the enterprises should be rewarded to a greater degree for exceeding the profit plan. At the present time, when the profit plan is exceeded by up to 3 percent, half of the above-plan profit remains with the ministry or enterprise, while the other is transferred to the budget. Increasing the portion of above-plan profits remaining at the disposal of the branch in such a case would be a more effective incentive.

In reality the ministries are still not adequately accountable for the results of the financial and management work of enterprises under their authority. In 1982, for example, several ministries which had been converted to the normative method but failed to fulfill the profit plan by a considerable amount, not only did not reduce their planned expenditures but, on the contrary, deducted a considerable amount over and above the plan to cover losses from ZhKKh [housing and utilities], to pay the interest on loans, and for other purposes. As a result they experienced a shortage of their own circulating capital. In 1981 the Ministry of Machine Tool and Tool Building Industry was the only to totally cover the shortage from internal sources. For the other ministries it was made up with allocations from the budget and with Gosbank loans. Unfortunately, the enterprises are developing few organizational and technical measures to obtain additional profits to make up shortages in their own circulating capital. In 1982, for example, profit obtained by the Ministry of Heavy and Transport Machine Building as a result of implementing such measures and used for this purpose amounted to only 0.4 million rubles, or 2 percent of the total shortage in its own circulating capital.

Among the measures contributing to increased production effectiveness and the strengthening of the economic levers, a significant place is assigned to the system for exacting payment for production capital. It calls for setting the standard at 6 percent, reducing the list of funds used under privileged terms, and introducing the practice of making payments for above-normal stocks of materials and uninstalled equipment not covered by loans, out of the profits left at the disposal of the enterprises. When production plans are fulfilled with a lower cost of funds the saving in these payments is left for the enterprise (except for that obtained by failing to fulfill the plan for start-up of fixed capital) and payments to the budget are reduced by that amount. During the first 9 months of last year payment for above-normal materials and uninstalled equipment not covered by loans reached 2 million rubles for the Ministry of Power Machine Building.

As of 1 January 1981 calculations for payments to the budget for funds by all the enterprises of the Ministry of Heavy and Transport Machine Building, the Ministry of Power Machine Building, the Ministry of Machine Tool and Tool Building Industry, the Ministry of Tractor and Agricultural Machine Building, the Ministry of Construction, Road, and Municipal Machine Building, the Ministry of Machine Building for Animal Husbandry and Fodder Production and the Ministry of the Electrical Equipment Ministry have been decentralized, with subsequent quarterly recalculations made. A study has shown, however, that a number of deficiencies are preventing the new procedure for collecting payments for funds from having a beneficial effect upon their use. In certain machine building branches low payment rates have been retained, a significant part of the production capital is not covered, and many enterprises with a low level of profitability are exempted from this payment. In the Ministry of Heavy and Transport Machine Building, for example, 34 percent of the enterprises were exempted and a rate of 3 percent was

set for 19 in 1982; 72 percent were exempted and a rate of 3 percent was set for 36 in the Ministry of the Electrical Equipment Industry; and 60 percent of the enterprises under the Ministry of Power Machine Building make no payments to the budget for funds. As a result, payments for funds account for a significant portion of total profits for a number of ministries (Table 2).

Table 2

Ministry	Specific portion of payment for funds in total profits				Specific portion of payment for funds in total payments out of profits			
	1970	1975	1980	1981	1970	1975	1980	1981
Heavy and Transport Machine Building	27.9	24.4	13.6	18.0	44.3	65.6	65.2	78.3
Construction, Road, and Municipal Machine Building	16.7	18.2	21.5	21.8	26.0	23.2	34.2	41.1
Tractor and Agricultural Machine Building	24.6	29.0	29.2	29.5	44.2	56.6	91.0	89.7
Electrical Equipment Industry	13.9	15.9	12.0	15.2	21.9	49.4	48.5	65.0
Machine Tool and Tool Building Industry	10.4	9.5	11.0	13.3	15.4	16.8	18.5	26.0
Machine Building for Animal Husbandry and Fodder Production	--	14.0	18.1	11.9	--	19.9	44.6	49.4
Power Machine Building	--	--	--	7.2	--	--	--	29.0

We feel that a number of measures should be implemented to assure that fuller use is made of the stimulating possibilities of the new procedure for exacting payments for capital under the normative profit distribution method. For enterprises whose profitability level does not permit them to make the standard payment of 6 percent for funds at the new wholesale prices and rates, the payment should be specified at the same percentage of the value of above-normal stocks of commercial materials and uninstalled equipment not covered by bank loans. For enterprises paying the 6 percent, it would be expedient to establish a payment rate for funds 1-3 points above the 6 percent from the value of above-normal stocks of commercial materials and uninstalled equipment not covered by loans. We obviously need to further reduce the abatements for these payments. When production capital is started up ahead of schedule, the enterprises should be exempted from the payments for new capital for the entire period of their actual operation up to the beginning of the planned period.

Improving planning, enhancing the role of the five-year plan, increasing the responsibility of those in charge for the fulfillment of plan assignments and for the thrifty use of materials and finances, and the expansion and further improvement of the experience in employing the normative profit distribution method are significant prerequisites for the functioning of the normative profit distribution method and other progressive elements of cost-effective management.

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## IMPROVE APPLICATION OF SCIENTIFIC-TECHNICAL POTENTIALS

Moscow PLANOVYE KHOZYAYSTVO in Russian No 4, Apr 84 pp 75-83

[Article by B. Zaytsev, professor, doctor of economic sciences: "Increasing the Efficiency of Utilizing the Scientific Potential"]

[Text] Expenditures for the development of science and technology increase in our country every year. At present (without taking into consideration capital investments in the scientific base and introduction of innovations) they constitute over 4.8 percent of the national income volume. The number of scientific workers reached 1.4 million persons, or one-fourth of the total number of them in the world.

This attests to the formation of a huge scientific-technical potential. Consequently, as is noted in the resolution of the December (1983) CPSU Central Committee Plenum, a major thrust must be made toward raising the level of economic operation, accelerating scientific-technical progress and more complete utilization of the production potential.

In the system of scientific-technical progress administration there are many potentials for increasing the efficiency of the activity of scientific-research and planning-design organizations and accelerating the introduction of achievements of science and technology in the national economy. These are, above all, an improvement in planning, economic incentive and material stimulations, as well as organizational forms of linking science with production.

It was emphasized at the 26th CPSU Congress that one of the main directions for improving planning is broader use of the program-system method. Specific ways to solve this problem are reflected in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures to Accelerate Scientific and Technical Progress in the National Economy."

In our country successful experience has been accumulated in developing and putting into practice scientific-technical programs at the state level. The use of new equipment designed according to their assignments ensures a saving in national economic expenditures, including ferrous metals, fuel and electric energy, and will permit a large number of workers to be freed from active production. At the same time, improving the program management is one of the basic resources for increasing the efficiency of utilizing the scientific potential.

The comprehensive scientific-technical programs are an intrinsic component of the national economic plans. Consequently, it is necessary to be more careful in carrying out their technical-economic substantiation and orientation toward raising the end results. Working out the programs presupposes clear-cut organization, the availability of normative documents regulating their form and structure and the process of formulating the assignments and responsibility of the administrative organs. At the same time, it is important to take into consideration the fact that the plans for the sectorial ministries should be drawn up on the basis of the programs. The forms of the five-year and yearly plans, however, are still not unified with the indicators, structure and content of the scientific-technical programs. There is also no interrelation of their assignments with the supply orders, which are the basis of administration of scientific research and development.

The main thing in putting the programs into practice, as experience has confirmed, lies in clear-cut work organization for the entire "research-production" chain, promptly delivering the assignments to the executor and supplying him with financial and material-technical resources. Of course, the difficulties here are great, since the activity of many scientific collectives must be coordinated by time and volumes of research. For example, in a comprehensive scientific-technical program for the development of powder metallurgy, there are 200 organizations, under the jurisdiction of 50 ministries and departments, interacting. Nonfulfillment of the corresponding assignment by one of them makes the efforts and results obtained by the others useless. Therefore, the ministries and departments must pay prime attention to organizing work and monitoring the fulfillment of the assignments.

Experience also confirms the fact that each program should have an administrative organ, provided with the appropriate rights and financial and other resources, as well as with funds for stimulation and material incentive. Without this it turns into a list of wishes.

The problem of eliminating the breaks between the links of the unified chain "research-production" awaits its solution. These breaks are mainly the result of the fact that the ministries and departments do not give a specific designation when they release the financial and material-technical resources necessary to put into effect the assignments contained in the programs. The assignments are, as a rule, of an intersectorial nature, which contradicts the sectorial affiliation of the scientific-technical potential. The ministries primarily ensure fulfillment of the sectorial tasks, based on departmental interests.

Analysis of the financing plans shows that assignments for state scientific-technical programs constitute on the average 15-20 percent of the work volume of sectorial scientific research organizations, while input for construction of experimental-industrial units does not exceed 1 percent of capital investments in the development of the sector. Under these conditions there can be no question of a shortage of funds for solving intersectorial problems. The point lies in the departmental approach, which is inconsistent with national economic interests.

A great deal is said today about increasing the role of the leading ministries responsible for fulfillment of scientific-technical programs. In particular, it is proposed that funds and resources necessary to carry out the assignments as a whole be released to them with a specific designation. In the opinion of the authors of these proposals, they could then more efficiently distribute the resources made available to them and monitor their utilization.

In our opinion, this way is not sufficiently effective and it is doubtful whether the ministries can cope with the given task. In most instances, sectorial ministries head 6-10 programs each, the number of executors of which (scientific-research institutes and planning-design bureos, associations and enterprises of other ministries) reach into the thousands. Each head ministry also acts as executor of at least 10 other programs. Counter listing of funds, transfer of resources and reciprocal supervision are inevitable.

It is also important to take into consideration the following circumstance. A head ministry should conclude an agreement on carrying out scientific research and developments with its executors. Can it be guaranteed that the ministries (or their scientific-research and planning and design organizations), having obtained the funds according to economic agreement, will not direct them toward the solution of other problems? According to the existing situation the buyer has no legal rights to demand from the executor strict adherence to the conditions of the agreement, and the latter bears no material responsibility for its nonfulfillment, both with respect to deadlines and quality and with respect to the necessary direction of the funds. The only control document is the account of the results obtained. The executor can use the financial resources of the economic agreement at his own discretion, justifying this, for example, by a shortage of workers, which the buyer is not in condition to compensate for.

With a view to accelerating scientific research and experimental design work for the most important directions in the development of science and technology (including for scientific-technical programs), as well as developments on long-range subject matter, the GKNT [State Commission on Science and Technology] is releasing to the ministries and departments from its own reserve the appropriate financial resources. Unfortunately, they are not always fully utilized in accordance with the purpose. Having discovered the violation, GKNT can take this into consideration in the following year, and when distributing the reserve take a more stern approach toward supplementary financing of these ministries and departments. What can the head ministry do? The program must be fulfilled, but there is no alternative to uninterrupted financing for the executors, regardless of their practice in spending the resources from economic agreements.

Those who advocate releasing funds and resources for state scientific-technical programs with a specific designation overlook the following. What is to be done with the conclusion of economic agreements when developing the first industrial series of new items, introduction of new industrial processes, developed in accordance with these planning documents and implemented by enterprises and associations of different ministries and departments? The

development of supplying products by assortment and products list in the established periods in accordance with agreements is one of the directions for improving the administration of national production and planning and evaluating the work of the enterprises and associations. This is a basic for direct economic relations. The head ministries, however, are not always the consumer of the new items, developed within the framework of the program. The need arises to conclude a second agreement with the direct consumer of these items, which is often the manufacturing ministry.

Many other questions also arise in connection with the proposal under discussion. For example, what should be the object of an agreement when putting a new industrial process into operation? Include or not include in it the raw material and materials necessary for fulfillment of the planned work volumes? How are the increased production outlays during the period of developing the innovation to be compensated? Therefore, summing up what has been said, the following conclusion can be drawn: at the present time there are no organizational-economic prerequisites for specific (through the head ministry) material-technical and financial ensuring of work fulfillment for the state scientific-technical programs.

It is sometimes proposed that the funds needed to work out state scientific-technical programs be passed to an interdepartmental administrative organ, most often GKNT. But in this case too, the list of problems arising is not diminished, and some of them (for example, GKNT should become the capital-holder of material-technical resources with the corresponding services and production funds) are practically insoluble.

In our opinion, improving the administration of the state programs lies in intensifying the planned inception, and further centralizing it. We uphold the point of view on planning all resources and capital investments for the executing ministries to implement state scientific-technical programs by a specific paragraph in the corresponding state plans. The ministries and departments can release to the subdepartmental organizations and enterprises for a specific purpose the funds and resources to fulfill the assignments of these planning documents. It is apparently expedient to work out criteria and norms to motivate fulfillment of the assignments and to reflect them in the plans.

This should become an integral part of the established procedure, in accordance with which the assignments of the state scientific-technical programs are subject to compulsory inclusion in the plans of the organizations, enterprises and associations and their priority provision with financial and material-technical resources.

Therefore, in the plans of the scientific research institutes and planning and design bureos, enterprises and associations there are reflected the assignments of the programs to develop and introduce new equipment, and in the corresponding state and ministerial plans—with a specific designation, the resources and capital investments necessary for their realization. This is an objective prerequisite and condition for fulfilling the program in full volume and in the stipulated periods.

The plan, as the 26th CPSU Congress emphasized, is the law. Just as any other law, no one has the right to violate it. Consequently, the problem is reduced to adhering to state discipline.

It would be a mistake, however, to ignore the possibilities of specific financing as an effective instrument for administering scientific-technical programs. At present its individual elements are utilized in financing programs in the sphere of natural and social sciences. There are broad potentials for it in the higher school.

Over 50 percent of the doctors and candidates in sciences is concentrated in higher educational institutions. Increasing the effectiveness of this potential is an important and urgent task. A great deal has been done to resolve it. Every year in the country's VUZ's for sectorial ministries alone, research and development worth several million rubles are carried out. They are implemented in accordance with economic agreements concluded with the associations and enterprises. At the same time, their subject matter mainly reflects specific problems.

Some ministries have worked out comprehensive programs to solve scientific-technical problems important for the sector's development. Many VUZ collectives have been drawn into putting them into effect, and the head institutions in which specific directing organs have been formed have been determined.

The first step was taken toward uniting and concentrating the forces of the scientists. However, the procedure for carrying out the research and development has remained as before--economic agreements with the sector's enterprises and associations. The VUZ of the buyer has found that the goal of the program can be fulfilled. In other words, solving the problem depends on the enterprise of the scientists and on coinciding the interests of the enterprise (association) with the direction of work according to the program.

Releasing funds to the head VUZ for scientific research and development on the whole for the program has been substantiated and is expedient. Practical organization of specific financing in this case presents no difficulties and does not require major changes in the planning procedure formed. The basic factor is still the economic agreement. At the same time, in the plans for financing scientific research and experimental design work for the higher educational institutions it is expedient to single out in a separate paragraph the wage fund to solve the tasks of comprehensive scientific-technical programs.

At the present time, the target-program method of planning is widely used in the union republics, sectorial ministries and individual regions. At the same time, it has not yet been used in scientific-research institutes and planning-design buros. Their plans are formed in most cases according to the proposal "from below", on the basis of the ideas advanced by individual scientists, laboratories and divisions. As a result there occurs, as was noted at the June (1983) CPSU Central Committee Plenum, a closure based on internal "dissertation" and group interests. The breaking away of the subject matter of scientific research and development from the demand of practical work is one of the reasons for work "on the shelf."

Before 1985 the sectorial scientific-research institutes and planning-design bureos should make the transition to the cost accounting system, based on payment for research completed and accepted by the buyer. Loans must be taken out to implement their current work. The experience of collectives working according to this system for several years already, revealed its positive aspects. The contacts of scientists with production was reinforced, the activity of researchers seeking optimal variants for realization of their ideas was increased, the efficiency of scientific activity rose. For example, in the last 10 years the actual economic effect of the Ural Scientific Research and Planning Institute of the Copper Industry, estimated per ruble of input, increased 1.5-fold.

Unfortunately, this efficiency does not always reflect the end national economic result. The institute carries out work on a large number of second-rate subjects, which can and should be fulfilled by plant technical and research subdivisions. These subjects, however, ensure that the scientific collective receives a much larger volume of resources in the incentive funds than for major long-range developments. When 10 jobs are fulfilled with a years' economic effect of 50,000 rubles each, the funds for organization will be 2-3-fold higher in comparison with introducing the results of research which ensures that an effect amounting to 500,000 rubles is obtained.

Another example. At the Karabashskiy Copper Smelting Combine, an industrial process was introduced for processing high-silicon ore, which is a direction new in principal in utilizing natural resources. For two years of its operation the economic effect was 1.7 million rubles. However the withholdings for the incentive fund proved to be half that for a dozen and a half other developments, which with respect to their content are nothing more than rendering technical assistance to enterprises.

A spot check in 1982 of the plans for scientific research and experimental design work for individual scientific organizations of machine building showed the following. The estimated cost of developments with a yearly economic effect of up to 100,000 rubles each was 26 percent of the total expenditures for the scientific research and design and planning institutes checked. The proportion of these developments in the total volume of the economic effect obtained by the organizations, does not exceed 3 percent. At the same time their effectiveness (relation of the effect to the estimated cost) was one-third that of the works, the economic effect of which was over 600,000 rubles. For research with an economic effect of over 1.4 million rubles in the period analyzed, approximately 7 percent of the resources were expended, but their contribution to the total size of the effect exceeded 18 percent.

The existing premises concerning stimulating scientific collectives, as we can see, arouse them to develop second-rate, small subjects. To raise their interest in developing long-range highly efficient models of new equipment, it is expedient to change the procedure for forming the economic incentive funds. The normative withholdings for developments with a small economic effect (up to 60-70,000 rubles) should be much less than with more effective research.

Let us note one more circumstance which to a considerable extent exerts an influence on the efficiency of using the scientific potential. A large part of the results of scientific research work is the basis for developing projects for new enterprises, shops and production facilities. The technical level of these projects, and consequently, the profitability of capital investments in construction in many ways depend on scientific ideas incorporated in the technical documentation.

In accordance with the established procedure, the results of research used in the plan become the "property" of its creators with all rights to material incentive. Moreover, scientific personnel do not have the right to attribute to their "personal account" the part of the actual economic effect obtained from putting the plan into effect. Withholding for the funds of the scientific-research institutes of resources to stimulate research, the results of which are used in drawing up the technical documentation for construction of new enterprises, shops and production facilities leads to interesting the scientists in carrying out such research and in seeking more long-range ideas and solutions. As a result, the effectiveness of capital investments rises and also of national production as a whole.

Plans of scientific-research institutes and planning-design bureos, on the one hand, should be practicable, containing applied and basic research, and on the other hand--formed in consideration of solving cardinal problems of developing national production. The system-programming method of planning may be used as the instrument contributing to the realization of these requirements.

Increasing the efficiency of utilizing the scientific potential and intensifying the activity of scientific collectives poses the task of designing research programs in each sectorial scientific-research organization. In consideration of the specialization of the latter, it is important that these programs be aimed at working out long-range problems, having specified in them comprehensive solution to the problems. As a result, the "dissertation" and group interests will stem from the tasks of organization, not form them.

Directing the activity of scientific collectives toward production needs will unquestionably lead to a reduction in the volume of work "on the shelf", and to an increase in the quantity of completed research introduced. This is equivalent to increasing a saving in social production costs without increasing labor and material-financial resources.

In the practical work of planning sectorial scientific-research institutes and planning-design bureos, it is expedient to introduce the appropriate correctives, related to the selection and adoption of the object of the study. At present, in a number of cases, by the time the development of the test model has been completed, its technical-economic parameters cannot bear competition with analogous, better world models. There is already obsolescent equipment in series production, the efficiency of which is lower than the preceding generations of machines at the moment of their introduction.

Plans for research and development are mainly oriented toward the level of output achieved in world practice. This is also a reason for the reduction noted in the efficiency of innovations. In our view, the assignment to develop machines and equipment, industrial processes and materials should be formed by calculating so that at the moment of their being handed over for production they are on the level of or higher than the best world models. At the start of the transition to this system, there will be a slight reduction in the number of equipment models designed, and in the effectiveness of input for developing science, but after that there will be a qualitative leap.

In accordance with the existing situation, the work of scientific research and planning-design organizations is evaluated by the economic results obtained by the national economy from use of the innovations. A considerable portion of the fundamental and basic research and all the applied developments are directed toward designing new machines and instruments, industrial processes and materials, administrative methods and labor organization. No matter how progressive they are, their real effect on the growth of national income appears after introduction into production. In other words, one of the reserves for increasing the efficiency of utilizing the scientific potential is acceleration and expansion of the volumes of introducing scientific-technical achievements. At the same time, introduction remains a bottleneck in the cycle "research-production."

In the system adopted for evaluating the activity and incentive of enterprises and associations, introducing innovations is a unique risk, and he who goes for it loses in the results of work and incentive funds. It is not really so difficult, however, to cut this "Gordian knot." In our opinion, a great deal can be solved on the basis of the decree of the CPSU Central Committee and the USSR Council of Ministers on improving the economic mechanism.

The ministries and departments now have the right to change the yearly plan of associations and enterprises, if their total quantity of items produced is less than the assignments of the five-year plan and other indicators connected with development of new product output are poorer. Therefore, a prompt, "legitimate" corrective makes it possible, without fear of nonfulfillment of the confirmed assignments and reduction of the incentive funds, to proceed to expanding the output of highly efficient items. At the same time, the work experience of associations and enterprises under the new conditions shows that there were practically no such refinements of the five-year plans.

The economic effect from carrying out scientific-technical measures was introduced by the decree referred to into the number of indicators approved for associations and enterprises. Correct use of this indicator in the practical work of planning and its inclusion among the capital-forming ones can have a noticeable influence on raising the interest of production collectives in introducing new industrial processes, means of mechanization and automation, and also new methods of labor management and organization. At the same time, it is important to emphasize the following. An assignment must not be determined with respect to effect on the basis of summing up the economic results which it is assumed will be obtained from measures planned for

introduction. A normative method must be used. It will make it possible to approve for the association (enterprise) in the five-year plan, with a breakdown by years, an assignment with respect to effect in a certain proportion, for example, for normative-net production. In the year's plan, however, the assignment will be expressed quantitatively in thousands of rubles.

Under these conditions the association (enterprise) is obliged to work out a set of measures for new equipment, which will ensure obtaining the planned effect, i.e., it will be compelled to introduce innovations more widely. Therefore, in our opinion, it is unjustified to exclude economic effect from the approved indicators in the experiment being carried out at present in a number of ministries.

A great potential for increasing the efficiency of input for research and development lies in further development of the integration of science and production. Its forms are varied and effective, but, unfortunately, are not used sufficiently widely in practice. This is one of the causes of preventing a reduction in the "research-production" cycle and holding back the rates of scientific-technical progress.

The imperfection of the models of new equipment planned for development in production often impedes the use of scientific achievements. There is no justification, however, to blame the developers in most cases, since due to the absence of a test base at a considerable number of scientific research institutes and planning-design bureos, the scientists and designers cannot bring their creation up to the assigned technical-economical parameters and technological requirements of production.

Let us give an example. Today in the country about 90 percent of the gasoline, diesel fuel and motor oils are used for internal combustion engines. Reducing the hourly expenditure of fuel by 1 g, calculated for horse power will save approximately 1 million tons of gasoline and diesel fuel per year. Engines have now been designed with a reduced fuel expenditure. Some 11 types of these machines are being developed at enterprises of the All-Union Industrial Association of Diesel Building. At the same time, diesel builders propose only in the future to equip the national economy with highly efficient engines. The problem is clear, and its solution for the sector's economic system presents no complications. Scientists have many interesting, promising results from research. Realization of them, however, is being held back at the stage of experimental testing due to the narrowness of the experimental base. Often these results are for a long time not materialized in test models and they are gradually obsolescent.

There are particularly great difficulties in accelerating use of scientific-technical achievements due to a shortage of capacities at experimental bases experienced by scientific research ministries of the light and food industries.

Experience shows that scientific-research organizations with an adequate experimental base achieve high results in bringing the models of new equipment to production, as well as highest indicators of efficiency in the work of the scientific personnel and designers. An example of this is the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences.

Often the prolonged periods of the "research-production" cycle stem from a lack of scientific equipment at the scientific research institutes. In reality, not every institute as yet has available the necessary measuring instruments and mechanisms for carrying out research and developments. Perhaps, though, even with the available potentials, the conditions can be created for prompt implementation of all the measurements?

In 1977 the Moldavian SSR Academy of Sciences made an analysis of the technical equipment of the subdepartmental organizations. As a result, it was established that the capital-labor ratio of the scientists was two-fold lower than on the average for the country and the relative proportion of obsolescent equipment and non-operative, mainly unrepai red instruments, was considerable. Also noted was the way out of the situation that has formed--centralization of carrying out automated experiments, and also of computers and devices for metrological software. For this purpose a cost accounting organization was set up--The Center for Automation of Scientific Research and Metrology. Over 30 percent of the academy's fixed capital was concentrated in it, including about 85 percent of the instruments from the general stock of measuring devices. Some 300 of its associates are carrying out orders not only from the academy's institutes, but also from higher educational institutions, scientific-production and production associations and sectorial scientific research institutes located on the territory of the republic. In addition, it is cooperating with a number of organizations of other republics. The actual indicators for the work of the center and its efficiency, level (coefficient) of use and productivity of the equipment confirm that such an experiment merits wide-scale dissemination.

The principal way to solve the problems of intensifying the national economy, and mechanizing and automating production is developing and introducing the newest resource-saving technology on the basis of the discoveries. This primary task of scientists and designers can be fulfilled within the framework of the sectorial and intersectorial technological centers. Our country has experience in setting them up.

At some enterprises in the Belorussian USSR methods are being introduced to manufacture parts made of metal powders. To develop the techniques for obtaining and processing them, as well as the equipment necessary for them, a special scientific-production complex has been established, i.e., a unique intersectorial industrial center, under the jurisdiction of the republic's Council of Ministers. Work is being done to set up sectorial industrial centers in the Ministry of Machine Building for Animal Husbandry and Fodder Production, the Ministry of Electrical Equipment Industry, the Ministry of Mineral Fertilizer Production and other ministries.

The development of communications between science and production in the organizational plan is a necessary, but insufficient condition for raising the efficiency of using scientific potential. For each form of integration it is expedient to draw up the statute determining its juridical status, as well as regulating the rights and duties of the head organization and structural subdivisions and establishing the systems of planning, incentive and accounting. When opening up this economic mechanism for administration it

is important to start from the organizational structure of the scientific-production complex and the essence and specific nature of its tasks. The effectiveness of the scientific-production association activity is high. Their potentials for accelerating the rates of scientific-technical progress, however, are not always fully utilized, in particular due to the fact that they are not ensured by the proper form of condition for their functioning as unified economic cells. Moreover, the solution of this problem, by running up against departmental barriers, is drawn out over long years.

Scientific-technical progress is the basis for development of the economic system and increasing its efficiency. At present, a considerable portion of the growth in production volume and profits at existing enterprises is ensured through use of new equipment. The problem, however, ensuing from the need to shift the national economy to an intensive path of development, lies in the fact that the entire growth is obtained by virtue of this factor. This, in turn, can be achieved through increasing the efficiency of the scientific potential and utmost acceleration of introducing the achievements of science into production.

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## MACHINEBUILDING ASSIGNED LEADING ROLE IN UPDATING ALL SECTORS OF ECONOMY

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[Article by Doctor of Economic Sciences N. V. Gareтовский: "The Acceleration of Scientific and Technical Progress and the Intensification of Social Production"]

[Text] The socialist transformation of society and the building of communism are directly connected with the development of science and technology and with the extensive use of their achievements in the national economy. Socialism, V. I. Lenin pointed out, requires the development of "equipment, which has been built according to the latest word of the newest science."<sup>1</sup> At the same time the need to bring scientific research closer to the practical needs of the building of socialism was repeatedly stressed by him. These instructions of Lenin are the basis of the management of the socialist economy, owing to which our country in a historically short period attained the leading level of progress and became a mighty industrial power, which has a mighty scientific and technical potential.

At the present stage of economic development, when in conformity with the policy elaborated by the 25th and 26th CPSU Congresses the comprehensive intensification of social production is being carried out, the scale of the use in the national economy of the achievements of science and technology is increasing significantly. "Vast work on the development of machines, devices and processing methods of both today and tomorrow awaits us," Comrade Yu. V. Andropov stressed at the June (1983) CPSU Central Committee Plenum. The acceleration of the growth rate of the productivity of national labor and the national income of the country and the amount of physical wealth, which the socialist state will be able to allocate for the implementation of its own economic and social programs on the further increase of the well-being of the Soviet people, depend on the development and introduction of new equipment.

In practice it is a question of the fact that at present the country is at such a level of economic development, when the further increase of the per capita consumption fund and the amount of national income as a whole is possible only in case of the sharp increase of the role of intensive methods of management on the basis of the introduction of new equipment and the acceleration of this

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1. V. I. Lenin, "Poln. sobr. soch." [Complete Works], Vol 36, p 300.

process. Of course, such an approach does not belittle the role of the extensive factor, nevertheless the calculations for the future show that the intensive means of development of the socialist economy is a decisive condition of the increase of the productivity of national labor and the national income. Under the influence of scientific and technical progress the constant change of the structure of social production and of the interrelations between its individual factors occurs, the skills of manpower--the main factor of social production--increase, the capital-labor ratio and labor productivity increase, the very nature of the production relations of socialism changes. Finally, scientific and technical progress changes the technical and fundamental structure of production, while the very development of science and technology has become at present one of the main directions of competition between the socialist and capitalist economic systems.

That is why the acceleration of the increase of labor productivity and the efficiency of social production on the basis of its technical development, which reveals the material content of the process of the intensification of production, at present is a fundamental question of economic policy.

In recent years specific measures, which promoted the technical improvement of production and on this basis the growth of labor productivity and the increase of the efficiency of the economy, have been implemented in conformity with the decisions of the party congresses.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Steps on the Acceleration of Scientific and Technical Progress in the National Economy" is a new important step in the direction of the implementation of the decisions of the November (1982) and June (1983) CPSU Central Committee Plenums on the cardinal increase of labor productivity on the basis of the extensive and rapid introduction in practice of the achievements of science and technology and advanced know-how and on the combination in practice of the advantages of the socialist system with the achievements of the scientific and technical revolution. Soviet science has a large creative potential, of which basic research, which determines the prospects and fundamentally new means of scientific and technical progress, which open new horizons in the study of nature and society, constitutes the basis. Sectorial scientific research and design organizations are making a significant contribution to the development of advanced technological processes and materials and prototypes of machines and instruments. Mighty scientific production associations and technological centers, which are capable of encompassing the entire cycle--from the origination of a scientific idea to its practical embodiment--are being established.

In 1982 3,500 prototypes of new types of machines, equipment, apparatus, instruments and means of automation were developed. The use in the national economy during the first 2 years of the current five-year plan of the proposals of inventors and efficiency experts yielded a saving of 13.9 billion rubles.

At the same time in the indicated decree of the CPSU Central Committee and the USSR Council of Ministers it is noted that the organization of the work in the country on the technical improvement of production still does not completely conform to the tasks posed by the party. In many ministries and departments, associations and enterprises the responsibility for the level of production and

the quality of the output being produced is low, the developments of the institutes of the academies of sciences of the USSR and the union republics and of the sectorial academies, as well as the potential of sectorial scientific research institutes, design, planning and design and technological organizations and higher educational institutions are being used poorly. This frequently has the result that the results of completed research work do not find extensive and rapid use in the economy, the link between science and production is broken.

In reality the assurance of complete interaction between them implies the timely transformation of scientific concepts, theories and developments into material and technical means and technological processes, which are necessary for production, into various types of raw materials and materials, which have specific desired properties and quality and so on. In turn, being created in the sphere of physical production, they all are the base, by the use of which science is raised to a higher level of development and makes new discoveries, which ensure further scientific and technical progress and the increase of production efficiency. In the end the measures of this decree are also aimed at the creation of the conditions for such interaction between science and production.

As is pointed out in it, the radical improvement of all the work on the acceleration of scientific and technical progress is the most important duty of party, soviet, economic, trade union and Komsomol organizations. In the next few years industry should ensure the output of products, which would conform to the best present models, as well as the introduction of advanced technological processes and the substantial increase on this basis of labor productivity in the national economy and the efficiency of social production and the acceleration of the growth rate of the national economy. All this means that, no matter at what level management or the control of its processes is carried out, they should be subordinate to the further and rapid advancement of the entire economy toward new gains of scientific and technical progress.

New, more advanced equipment will be developed and will be introduced extensively. Moreover, it is a question not so much of the development and use of individual new types of it, but of the production of systems of machines, which would encompass the entire production cycle, including transportation, loading and unloading and checking operations, which will make it possible to speed up drastically the growth rate of labor productivity. The development and introduction in production of construction materials with high physical, chemical and mechanical properties are connected with the solution of this problem.

An extensive set of measures in the area of planning, financing and economic stimulation, the implementation of which will make it possible to achieve an increase of the effectiveness of scientific research work and to actively promote the large-scale introduction of the achievements of science and the concentration of the scientific potential on the meeting of both current and long-range needs, is being carried out in conformity with the decree of the CPSU Central Committee and the USSR Council of Ministers on steps on the acceleration of scientific and technical progress.

The new stage in the implementation of the scientific and technical policy is characterized by the significant increase of the role of the plans and

assignments on the development of science and technology and of the demandingness and responsibility for their fulfillment. It is deemed necessary to expand the use of the goal program planning of science and technology. For these purposes starting with the 12th Five-Year Plan there will be elaborated: first, all-union scientific and technical programs; second, republic and interrepublic programs; third, sectorial and intersectorial programs and, fourth, scientific and technical programs of regions and territorial production complexes. The basic assignments of the all-union scientific and technical programs will be included in the state five-year and annual plans of the economic and social development of the USSR, while the assignments of the republic and interrepublic programs will be included in the plans of the union republics. The assignments of the sectorial and intersectorial scientific and technical programs will become a component of the plans of the USSR ministries and departments, while those of the scientific and technical programs of regions and territorial production complexes will become a component of respectively the state five-year and annual plans of the economic and social development of the USSR and the union republics and the plans of the USSR ministries and departments.

For the fulfillment of the indicated programs in the plans the priority allocation for them of the necessary financial, manpower, material and technical resources, as well as limits of planning and surveying work, capital investments and contracting construction and installation work is outlined. A special reserve of assets is being established at the disposal of the USSR State Committee for Science and Technology by means of annual deductions from the unified funds for the development of science and technology of USSR ministries and departments in the amount of 1.5 percent of the portion of these funds, which is spent on the assimilation and introduction of new equipment. The assets of this fund will be the source for the additional financing of operations which are being carried out in conformity with the all-union scientific and technical programs.

It is necessary to note that the scientific and technical programs are a new form of the management of scientific and technical progress, which makes it possible to efficiently concentrate the efforts of scientists, designers and production workers on a specific goal, which ensures the development and rapid introduction in practice of new, more advanced equipment or technology.

The elaboration of scientific and technical programs is acquiring at present an especially great importance in the increase of the efficiency of social production, taking into account that their ultimate goal is to accelerate the introduction of new equipment. Meanwhile until very recently a significant portion of the developed prototypes of new equipment had not been turned over in good time to production, the period of its assimilation was frequently dragged out, while the possible economic advantage was lost. In the past decade, for example, in the year of their development 20 percent of the prototypes were turned over to production, for the second year--30 percent, for the third year--18 percent, while the production of the remainder was postponed to a subsequent period. Reserves, as is evident, are available.

Definite experience has been gained in the elaboration of scientific and technical programs. It is a question of using it more extensively under the conditions of the solution of new major national economic problems which are connected

with the intensification of social production and the increase of its efficiency. Thus, the implementation of comprehensive scientific and technical programs, which were elaborated by the USSR State Planning Committee, the USSR State Committee for Science and Technology and the USSR Academy of Sciences and were included as a component in the plan of the economic and social development of the country for 1981-1985, is one of the distinctive traits of the 11th Five-Year Plan. In all 170 such programs were approved, of them 41 are goal programs, which are called upon to ensure the implementation of the most important and effective scientific and technical achievements from the point of view of the national economy, including the series production of new products. The remaining comprehensive programs are aimed at the solution of the most important scientific and technical problems and the development of equipment, technological processes and materials, which should be introduced during the 12th Five-Year Plan.

It is possible to draw the conclusion that the main point of the elaboration of scientific and technical programs reduces to saturating the sectors of the national economy with new equipment and technology and thereby to increasing their technical level and already on the basis of the increase of qualitatively new capacities to achieving the further saving of labor and material resources and the increase of the output-capital ratio. A comprehensive approach is necessary in order to implement such measures more thoroughly. The plan of the assimilation and introduction of new equipment will now act as a unified plan, which is closely linked with the plans of production and capital construction, which in turn will become its components and continuation. As a result of the indicated approach each ruble of capital investments or other expenditures should be evaluated first of all from the point of view of the increase of the technical level of production and its efficiency.

The implementation of scientific and technical programs is one of the most responsible sections of the research of scientists and engineering and technical personnel during the current five-year plan. The timely and complete fulfillment of these programs will make it possible to provide in terms of 1985 an economic impact in the amount of about 16 billion rubles, to save 4 million tons of ferrous metals, 50 million tons of conventional fuel and 14 billion kWh of electric power and to free about 3 million people for other jobs.

In other words, the elaboration of scientific and technical programs and their implementation are becoming decisive factors of the intensification of social production and the increase of its efficiency. And here the leading role is being assigned to machine building and to the drafting and implementation of the scientific and technical programs of machine building itself in order to accelerate the process of the updating of the technological equipment in all the sectors of the economy, as well as to decrease manual and difficult physical labor sharply and thereby to achieve the acceleration of the growth rate of labor productivity.

It is planned in case of the formation of the state plans of economic and social development by the USSR State Committee for Science and Technology and the USSR State Planning Committee to approve upon the representation of USSR ministries and departments and the councils of ministers of the union republics a list of the types of products of machine building, which are of the greatest

national economic importance. At the same time the assignments on the production of prototypes of machines and equipment from among the types of products of machine building, which are of priority importance, will also be included along with the assignments on the assimilation of new types of industrial products in the five-year and annual plans of the economic development of the USSR and the union republics. The assignments on the production for them of the basic components and materials will also be included in the plans.

The poor use of scientific developments for the production of new products of machine building in many cases is connected with the lag of the pilot production and experimental base of a number of enterprises behind present requirements. In this connection it is planned when drafting the plans of the economic and social development of the USSR for 1984-1990 to envisage a set of measures, which are aimed at the overcoming of the lag in the building and technical equipment of pilot and experimental bases and works. In the five-year and annual plans assignments on the construction or renovation and placement into operation of pilot and experimental plants, works, shops, sections, installations, stands and bases are being established for production and scientific production associations, enterprises and organizations. Along with the indicated measures a reserve of production capacities for the timely preparation of the production and the assimilation of the output of new types of machines, equipment, instruments and materials is envisaged in the plans starting with 1984. This reserve of capacities for the indicated purposes is also formed by means of the increase of the machine shift coefficient.

In the development of machine building and the acceleration on this basis of scientific and technical progress the implementation of measures on the further expansion and intensification of the intersectorial specialization and cooperation of production in this sector has an important role. The sectorial ministries, when implementing measures on the technical development of the sector, frequently leave intersectorial problems outside the sphere of their activity. Meanwhile, as practical experience shows, precisely in this sphere there are great opportunities for the acceleration of scientific and technical progress in all the sectors of the economy and the increase of labor productivity. Measures on the further expansion and intensification of the intersectorial specialization and cooperation of production on the basis of the maximum standardization of assemblies and parts and with the use of new equipment and technology will be implemented.

The acceleration of the development of the machine building sector and the increase of the output of products are also acquiring particular urgency in connection with the fact that it is planned to introduce into the practice of national economic planning differentiated standards of the time of their updating or modernization. Such standards are elaborated by the main ministries for the production of machine building products jointly with the ministries which are the main users. This is a fundamentally new approach to the time of production of equipment. It is also characteristic that starting with 1986 the assignments on the phasing out of obsolete machine building products will be included in the plans on the basis of the indicated standards. Of course, the standard method of determining the time of the updating or modernization of equipment should also be extended to the assignments on the development, assimilation and preparation of the production of new types of machines, equipment and instruments and the modernization of the existing types.

The materials of surveys show that individual machine building enterprises and their engineering and technical collectives are not displaying the proper activity in the updating of products and the output of higher quality types of them. Meanwhile the improvement of the quality of a product is the most important factor of the increase of labor productivity, since the increase of its reliability, productivity and durability is equivalent to the increase of the amount of use values. The increase of the technical level and quality is being checked first of all by the low rate of updating and the length of time, which passes from the development of the prototype to its series production, during which an innovation, as they say, becomes thoroughly obsolete. Thus, at individual enterprises of the Ministry of the Automotive Industry, the Ministry of Machine Building for Light and Food Industry and Household Appliances and the Ministry of Tractor and Agricultural Machine Building from 35 to 43 percent of the products were put on the conveyor more than 10 years ago.

A new system of the certification of industrial products according to two quality categories--the highest and the first--has been introduced as of 1984. The industrial products, which are not assigned to one of these categories, should be removed from production. Only in exceptional cases with the permission of the USSR State Planning Committee in accordance with the applications of ministries, which have been submitted for approval to the USSR State Committee for Science and Technology, can the output of such products be carried out for not more than 2 years. All these measures are also aimed at the acceleration of scientific and technical progress in the national economy, and their consistent implementation will make it possible to take a significant step in the matter of the intensification of social production and the increase of its efficiency.

The practice of management shows that in the entire chain of scientific and technical progress, beginning with the discovery and the development of an idea to its specific embodiment in a finished product, the setting up of the mass production of new equipment and its introduction, the last links are frequently most difficult in the realization of the entire cycle. This is connected first of all with the fact that often the economic interest of associations and enterprises in both the assimilation of the production of new types of products and the introduction of new equipment in production is still inadequate. At times the situation is aggravated by the fact that the setting up of the output of new equipment or its introduction in production entails the worsening of the indicators of work, in particular, the decrease of the product cost, the reduction of the specific expenditures of labor and materials and the increase of the profit are not always ensured. The bank loans, which have been obtained for the acquisition of such equipment, cannot always be repaid on the set date. The experience of the enterprises, which have achieved the highest indicators in the technical improvement of production and the increase of its efficiency, is also being inadequately taken into account. All this leads to the incomplete realization of the possibilities of the increase of production efficiency by means of the use of advanced technological processes, new means and objects of labor and the methods of the scientific organization of labor. The introduction of advanced means of production does not always find proper reflection in the plans of ministries, departments and enterprises.

The procedure of planning and the indicators of the evaluation of the cost accounting activity of associations and enterprises, on the fulfillment of which, in turn, the material and moral incentive of production collectives depends, needs improvement.

In socialist society the enhancement of the role of the economic levers and stimuli of the comprehensive use of the achievements of scientific and technical progress by the collectives of associations and enterprises first of all is connected with the improvement of the planning of this process and the improvement of the indicators, which are used in the plan and in case of the evaluation of the activity of the results of labor on the accomplishment of the technical development of production. The pursuit of a uniform technical policy and the fundamental combination of the achievements of scientific and technical progress with the advantages of the socialist system of management are ensured through the plan and centralized planned management with the use at associations and enterprises of an extensive interconnected set of cost accounting indicators and stimuli. The steps on the improvement of the indicators of the evaluation of the activity of enterprises, on economic stimulation, pricing and others, which are envisaged in the decree, are aimed precisely at the accomplishment of this task. Their implementation will make it possible to develop significantly the cost accounting principles in the matter of the further improvement of the technical level of production, the development and the assimilation of the series production of products.

Thus, the fulfillment of the plans and assignments on the development of science and technology is now included among the most important indicators, on the basis of which first of all the results of the economic operations of production associations and enterprises are evaluated. These indicators are also taken into account when tallying the results of the socialist competition. The degree of responsibility for the nonfulfillment of the indicated assignments--the decrease by not less than 25 percent of the bonuses for managerial personnel of enterprises--has also been established. It will be used both in instances of the nonfulfillment of the plans and assignments on the development and assimilation of new equipment and the introduction of advanced technology and in case of the output of products upon the expiration of the standard time of their updating or modernization. The increase of the role of the state plan in the stimulation of scientific and technical progress is a natural phenomenon of mature socialism. As the scientific and technical tasks being accomplished become more complicated and the scale of their influence on the efficiency of social production increases, the role of the socialist state in the implementation of measures, which are aimed at the combination of science with production, and in the assurance of the acceleration of economic growth due to this factor will also increase in the future.

The activity for the development and introduction of new equipment, advanced processing methods and materials, which according to the most important indicators correspond to the world technical and economic level or exceed it, as well as for the increase of the proportion of new highly efficient products in the total production volume is now being stimulated in increased amounts. The USSR ministries and departments and the councils of ministers of the union republics can permit bonuses to be paid to managers, engineering and technical personnel and other specialists of associations, enterprises, scientific research, design,

planning and design and technological organizations, who took part in the fulfillment of the above-indicated assignments, in excess of the set maximum amounts. The ministries and departments in necessary instances can also permit subordinate associations, enterprises and organizations to transfer a portion of the assets of the material incentive fund and the fund for sociocultural measures and housing construction, which are formed by means of deductions from the profit which is obtained from the decrease of the product cost, to other enterprises, organizations and higher educational institutions of both their own sector and other sectors of the economy, which took part in the fulfillment of the all-union scientific and technical programs. All this broadens considerably the opportunities of the main enterprises and organizations in the use of economic levers or in cooperation with other organizations under the conditions of the fulfillment of the all-union assignments on the development and assimilation of new types of equipment.

One-time bonuses of USSR ministries and departments and the councils of ministers of the union republics for the development and assimilation in production of highly efficient equipment, advanced technology and new materials are being introduced as of 1985. First of all it is planned to pay such one-time bonuses, and their amounts come to 3,000 to 40,000 rubles each, to the workers who have ensured the development and assimilation in production of machines, equipment and instruments, which have been included in the list of types of machine building products which are of the greatest national economic importance. The change-over of associations, enterprises and organizations of construction, transportation, communications, geology, agriculture and material and technical supply to a cost accounting system of the organization of the work on the development, assimilation and introduction of new equipment will be carried out.

The stimulating role of the wholesale price in the increase of the output of machines, equipment, instruments and other products of a high technical and economic level is also increasing. This will be achieved by the establishment of an incentive markup on the wholesale price in the amount of 30 percent, if the product being produced is actually new and highly efficient and is not inferior in its parameters to the best domestic and foreign models. At the same time a price reduction in the amount of up to 30 percent will be used for products which are being produced, but are to be removed from production.

The fulfillment of the tasks on the acceleration of scientific and technical progress in the national economy, which were posed by the CPSU Central Committee and the USSR Council of Ministers, is taking place on the basis of the improvement of the organizational forms of the management of this process, the strengthening of all the units which are connected with the development and introduction of new equipment, and the improvement of the training of scientists and highly skilled specialists. A specialized network of large production and scientific production associations and enterprises is being set up for the significant improvement of the use of the scientific and technical potential of the country and the intensification of the integration of science and production. The practice of organizing at production associations and enterprises temporary scientific production subdivisions (complexes) for the most important national economic problems is also being expanded. The position of general designer for basic types and systems of machines, equipment and instruments is being introduced at individual large enterprises and organizations. The

measures on the further concentration of the forces and assets of scientific research, design, planning, planning and design and technological organizations on the accomplishment of the key tasks, the fulfillment of which would ensure the meeting of both the current and long-range needs of the national economy, will hold an important place. Such a new form of the organization of the labor of scientists, engineers and technicians as the setting up in necessary cases of temporary collectives for the performance of work on the solution of long-range scientific and technical problems of an intersectorial nature and on the development and assimilation in production of new equipment, technology and materials is being used for the purposes of speeding up the solution of scientific and technical problems.

The improvement of the organizational forms of the management of scientific and technical progress is taking place at the same time as the increase of the role of the users of products in the drafting of the plans of scientific research and experimental design work and the production of new equipment. This will find expression first of all in the fact that now the USSR ministries and departments, which are the main or leading ones according to the types of products being produced, are obliged to prepare and approve in consultation with the USSR State Committee for Science and Technology, the USSR State Committee for Standards and the ministries and departments, which are the basic users of the corresponding products, ranges of models and systems of machines, equipment and other machinery. On their basis the assignments for subordinate enterprises and organizations on the development and assimilation of the production of new equipment, components and materials, as well as on the phasing out of obsolete types of products are envisaged in the plans of scientific research and experimental design work and the production of new equipment.

The fact that now the approval of the technical assignments for the development of a new product or the modernization of the product being produced, if it is used in several sectors, as well as the making of suggestions on its production or, on the contrary, the halt of production can be carried out by the ministry only in consultation with the other ministry, which is its main user, is also an important organizational feature in the improvement of the management of scientific and technical progress. For example, with respect to consumer goods the functions of their basic user have been assigned to the USSR Ministry of Trade. In instances of the rejection by the users of the equipment, which has been produced in accordance with their orders, or a delay with its placement into operation the clients bear material liability for this. The settlement of all questions, which are connected with the scientific organizational and methods supervision of the activity of ministries and departments on the acceleration of scientific and technical progress, is now carried out by the USSR State Committee for Science and Technology. The making starting in 1985 of a state check of the activity of sectorial scientific research, design, planning, planning and design and technological organizations has been assigned to this committee and the USSR State Committee for Construction Affairs.

It should be noted that the monitoring of the course of scientific and technical progress and the fulfillment of the corresponding programs on the development and building of new equipment will also be carried out by means of an extensive information network which is at the disposal of the USSR State Committee for Science and Technology. Centers of scientific and technical information of this

committee exist in every republic, kray and oblast, they are obliged to prepare information on the course of fulfillment of the scientific and technical programs locally and to inform the party and economic organs regularly about the results of their fulfillment.

Thus, an extensive set of measures is being implemented in conformity with the decree. The attention of the workers of all enterprises and organizations and their superior organs should be focused on the accomplishment of the tasks posed in it. An important place in this work is also assigned to the collectives of financial and credit organs. The state is constantly allocating from the budget in ever increasing amounts assets for the covering of the expenses on science. In 1980 they came to 22.3 billion rubles, while in 1982 they came to 24.6 billion rubles. This is causing the need for a more thorough knowledge of the activity of the scientific or other institutions, which account for a large portion of the assets intended for the development of science, in order to strive for their most effective expenditure. The involvement of credit in the implementation of measures on the acceleration of scientific and technical progress is also being broadened.

The institutions of the banks, while carrying out the daily monitoring of the progress of the economic and financial activity of production, scientific production and other enterprises and organizations, as well as their credit and settlement service, should devote even more attention to the questions of the fulfillment of the assignments on the technological improvement of production and should analyze their influence on the improvement of the qualitative indicators of the work of enterprises and first of all the acceleration of the growth rate of labor productivity. The development and introduction of new equipment first of all should find reflection in the dynamics of this indicator, since economic and social progress finds manifestation in its increase on the scale of society. In turn, the dynamic increase of the indicators of labor productivity, as well as the efficiency of social production is a manifestation of the development of productive forces and the maturity of production relations. These most important end results of the implementation of the measures on the development of science and technology should also be at the center of attention of the workers of financial and banking organs.

The checks and analysis of the economic and financial activity of enterprises and organizations according to the results of the year show that the influence of the technical improvement of production on labor productivity can find manifestation, first, in the increase of this indicator in percent as compared with the level established in the plan or with the level achieved during the preceding period under review; second, in the acceleration of the growth rate of labor productivity and, all other things being equal, the assurance of the increase of the proportion of the increment of output, which was obtained due to this factor, and, finally, in the form of the saving of labor in terms of the annual number of workers with respect to the base year.

The interconnection between the introduction of new equipment and the growth of labor productivity and, consequently, the increase of production efficiency and the growth of the net income of society and the profit of enterprises should be direct--this is the most important end result of cost accounting activity on the basis of the use of scientific and technical achievements. Meanwhile, as has already been noted, in practice the instances, when the

introduction in production of new machines and equipment is not accompanied by an increase of labor productivity, have not yet been eliminated. When identifying such instances the main attention should be focused on the analysis of the causes of such a discrepancy, bearing in mind that the national economy needs not in general new equipment, but only that equipment which yields a real economic impact.

The institutions of the USSR State Bank at present extend credit for a period of up to 3 years for the expenditures on the introduction of new equipment, the mechanization and the improvement of the technology of production. Credit is also granted by them for the automation of production processes and other measures on technical improvement, which do not involve new construction. All these types of operations are carried out in excess of the limits of state capital investments. Credits for a period of up to 6 years in case of a shortage of assets of the production development fund are issued to industrial enterprises for the indicated purposes, as well as for the expansion and the organization of the production of consumer goods.

The bank also grants credits for the implementation of highly effective measures on the development of science and technology, which were not envisaged in the plan, with repayments of the debt and interest on the loans by means of the assets of the unified fund for the development of science and technology in the course of 2 years from the day of the issuing of such loans. These credits are granted on the guarantee of ministries, departments or all-union and republic industrial associations.

The institutions of the banks, when granting credits for the expenditures on the implementation of scientific and technical measures, should devote particular attention to the soundness of the calculations of their economic effectiveness. The checks show that in case of the implementation of approximately analogous measures on the technical improvement of production their effectiveness at individual enterprises in 1982 was less than in 1981. This affected the decrease of the number of conditionally freed workers, the reduction of the amount of profit and the saving from the decrease of the production cost per ruble of expenditures. As a result the payback time also increased somewhat.

When checking the economic and financial activity of ministries, departments, associations, enterprises and organizations and the expenditure by them of financial and material resources, it should be taken into account that the use of resources, including bank credits, for the implementation of measures on the extensive automation of technological processes on the basis of the use of automated machine tools, machines and devices, standardized models of equipment, robotic complexes and computer equipment should be the main direction of the work on the acceleration of scientific and technical progress. Therefore, such operations as the development of flexible automated works and automated designing systems, which would ensure a substantial increase of labor productivity and a sharp decrease of the proportion of manual labor, should find reflection in the assignments on new equipment. Moreover, it is necessary to envisage constantly measures on the increase of the technical level of the products being produced, as well as to ensure the shortening of the time and the improvement of the quality of planning and design work. Such assignments are being included in the plans of ministries and departments and the enterprises

organizations, which are subordinate to them, on the basis of the all-union programs of work in the area of the development of flexible automated works and automated designing systems and their use in the national economy.

The results of the conducting of the experiment on the planning of the activity of scientific production associations for the sector "Science and Scientific Service" as a whole with the exclusion from the list of indicators, which are approved by a superior organ, of the assignments on the total volume of output should be thoroughly studied and generalized. The experiment is being conducted in 1984 at individual scientific production associations of the ministries of the electrical equipment industry, instrument making, automation equipment and control systems, heavy and transport machine building, as well as at a number of other enterprises of the union republics. When studying the results of the conducting of this experience it is important to ascertain, whether the abolition of the assignments on the production of mass-produced products in value (volumetric) terms promoted the orientation of the collectives of the scientific production associations toward the development and assimilation of prototypes of efficient new equipment and the development of advanced technological processes. The increase of the profit at them now depends to a greater extent on the fulfillment of the plan assignments on the development, building, assimilation and introduction of new equipment. During the checks of the activity of scientific institutions it is important to ascertain, whether state resources are not continuing to be consumed for minor themes and whether the duplication of the work of scientific institutions is not being permitted. In case of the identification of such cases it is necessary to pose to superior organizations questions about the merging or elimination of individual organizations.

At the present stage of the building of the economy increased demands are being made on the determined theme of scientific research work. It should direct the collectives of scientific institutions, especially academic institutions, at the accomplishment of the urgent tasks of the development of the national economy and the development of fundamentally new types of equipment and technology, which would ensure the efficient consumption of fuel, energy, material, manpower and raw materials resources and the protection of the natural environment, as well as would promote the large-scale introduction of the achievements of science in production. It is a matter of increasing sharply the level and effectiveness of scientific research work and of increasing the influence of its results on the increase of the net income of society.

The acceleration of the introduction in production of new scientific ideas and developments in many ways depends on the availability of pilot and experimental plants, works, shops, sections or installations. It is envisaged by the decree to implement measures on their renovation or new construction. On this basis the need is arising to tighten up bank monitoring of the use of the assets being allocated for these purposes in conformity with their purpose. It is also important to notify superior organs in good time in those instances when the assets are not being completely assimilated or are being used for the wrong purpose.

In connection with the need for the acceleration of scientific and technical progress on the basis of the introduction of new equipment and the

establishment of the standard time of its output in production the question of the most efficient and complete use of the operating productive capital, as well as amortization deductions in accordance with their special purpose is acquiring particular urgency. At present the diversion of the amortization deductions, which are intended for the replacement of fixed capital, for other purposes is frequently permitted. The acceleration of the development of machine building on the basis of the output of new equipment will require the increase of the goal orientation in the use of amortization deductions. For the more the replacement of fixed capital slows down and its obsolescence is permitted, the more slowly labor productivity and production efficiency increase. At the beginning of the five-year plan in industry the capital more than 10 years old came to more than 38 percent, including about a third in machine building, about 40 percent in light industry and nearly a half in the food industry.

In connection with the problem of the improvement of the use of operating fixed capital and especially the fixed capital being newly put into operation and the timely achievement by it of the rated indicators the question of the determination of the number of workers is acquiring particular urgency. As is known, a limit of the number of workers is now established for enterprises, but this limit comes from the base and the planned production program for the new year. Practical experience shows that for the efficient use of productive capital and manpower it is advisable to introduce in cost accounting activity the indicator of the number of workplaces. This is also a limit, yet not from the base, but from the actual need for workplaces for the fulfillment of the state plan assignments with allowance made for the desired labor productivity. Under these conditions the number of workplaces being newly created should also be determined on the basis of the availability of manpower resources, the limits of capital investments and the productivity of the new equipment which is being introduced by means of these limits.

The policy of the acceleration of scientific and technical progress also requires a more careful approach to the use of the credit resources which are being allocated for capital investments. Here not only the checking of the soundness of their repayment on the dates set by the credit agreements, but also the monitoring of the assurance of the increase of labor productivity from new investments as compared with the prevailing level at approximately analogous enterprises merit special attention. Credit resources should be allocated first of all for the financing of the facilities, at which the greatest labor productivity is ensured. Meanwhile this does not always happen that way, frequently the repayment of credit on the stipulated date is the only criterion of the granting of bank credit. At present this is already insufficient, for it is also possible to ensure the recovery of credit investments in case of the use of old equipment.

The increase of the influence of credit on the acceleration of the introduction of new equipment is one of the most important conditions of the assurance at enterprises of a leading growth rate of labor productivity as compared with the growth rate of the average wage. Thus, checks show that in case of the increase of labor productivity as a result of the introduction of new equipment and technology the increase of the wage for each percent of increase of the labor productivity is formed for the increase of production efficiency in a more

favorable ratio than in case of its increase as a consequence of the increase of the skills of workers, the combination of occupations and so on.

The gradual changeover of enterprises, where this is economically expedient, to the financing of their activity, including new construction, by means of their own resources and credits of banks may become one of the factors, which prompt enterprises to influence more effectively the supplier of new equipment and its observance of the rated parameters of its efficiency. Such a procedure will force enterprises, especially in case of their renovation and retooling, to approach more carefully the quality of new equipment and new technical decisions, and in instances of the failure to observe the parameters of efficiency, which were promised by the producer, to bring action against it for the recovery of the lost impact.

The increase of the quality and the enlargement and updating of the assortment of items are an important direction of the acceleration of scientific and technical progress. The output of new or improved products, as a rule, presumes the observance of the standards or specifications, on the basis of which they should be produced. In practice individual enterprises allow deviations from the established standards or specifications, which validly evokes reproaches on the part of consumers and affects the quality of the products being produced. "The Statute on the Procedure of the Use of Economic Sanctions for the Violation of Standards and Specifications" was approved on 12 July 1983 by the USSR State Committee for Science and Technology, the USSR Ministry of Finance, the USSR Central Statistical Administration, the USSR State Committee for Standards and the USSR State Committee for Prices. A uniform procedure of the material liability of enterprises and organizations for the violation of standards and specifications, including the established references and formulas, is introduced by the statute. Now the entire profit actually derived by an enterprise or organization from the output of products and the performance of work and services, which do not conform to the standards and specifications, is liable to mandatory payment to the budget, while the products themselves are not counted by statistical organs toward the fulfillment of the state plan assignments. This is a new factor which should be taken into account by financial and banking organs in case of the checking of enterprises and organizations and analyses of their economic and financial activity.

The implementation of the measures on the acceleration of scientific and technical progress in the national economy, which have been outlined by the CPSU Central Committee and the USSR Council of Ministers, is taking place under the conditions of the improvement of the economic mechanism as a whole. In this connection the consistent and complete implementation of the measures, which are outlined in the decree of the CPSU Central Committee and the USSR Council of Ministers on the conducting of a large-scale economic experiment in a number of ministries and departments of the USSR and the union republics, is acquiring great importance.

The workers of financial and banking organs need to study thoroughly the essence of these economic experiments and their opportunity to utilize fully the new measures on the technical improvement of production for the acceleration of the growth rate of the productivity of national labor and the increase of production efficiency. The entire economic mechanism should be improved in

conformity with the new conditions of the accomplishment of scientific and technical progress, while the specific forms of its influence on economic interests should conform to the achieved level of the development of productive forces and the constantly increasing scale of social production.

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## IMPORTANCE OF INVENTIONS IN SCIENTIFIC PROGRESS DETAILED

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[Article by Igor Chervyakov and Lotar Nikht, CEMA Secretariat: "A Most Important Factor in Acceleration of Scientific-Technical Progress"]

[Text] One of the basic economic-policy tasks of communist and workers parties of CEMA member countries at the present stage is that of most efficient use of production and scientific-technical potential. For this reason comprehensive exchange of operational experience is becoming today a most important direction of integration and a most diverse form of cooperation of the fraternal countries. At the 37th CEMA Session held in October 1983, the need was again pointed out to increase the active exchange of advanced scientific-technical achievements and production experience.

### The Effect of Inventions

Widespread prompt and effective introduction of inventions as a form of technical application of advanced scientific ideas in the national economy acquires increasingly greater importance. In CEMA member countries a steady growth is observed of requests for inventions and newly registered inventions (Table 1).

On the whole, the share of fraternal countries in the world list of inventions in 1982 amounted to 41 percent. In other words, almost every second invention in the world originates today in the countries of the socialist community. In 1982 their national economies introduced 46,842 inventions, or 44 percent of newly registered inventions. In 1987-1982, the economic effect from industrial utilization and dissemination of inventions in the national economies of Bulgaria, Hungary, the GDR, the USSR and Czechoslovakia grew constantly (Table 2).

The aggregate national-economic effect from introduction of the inventions increased from 1.2 billion rubles in 1971 to 3.6 billion rubles in 1982, that is, threefold.

Table 1

	1978	1982
Applications submitted for invention rights (from national declarers)	166,851	187,365
Protective documents registered for inventions (by national declarers)	73,999	107,359

Table 2 (millions in national currencies)

CEMA member countries	1978	1979	1980	1981	1982
Bulgaria	80	108	115	86	113
Hungary	3,994	3,389	3,000	3,700	5,382
GDR	533	673	591	762	885
Poland	2,260	2,653	2,105	1,585	1,598
USSR	1,467	2,030	2,481	2,640	2,611
Czechoslovakia	1,224	1,377	1,512	1,600	2,022

#### Improvement in Exchange of Inventions

Since 1 January 1977, a system of mutual exchange of information on very important inventions among interested fraternal countries has been in operation. Its chief purpose is to increase the effectiveness and scope of use of the results of scientific-technical and planning-design work and to promote accelerated development of productive forces through the dissemination of already tested and adopted inventions of intersectorial and interdepartmental significance that are suitable for use in other CEMA member countries while taking into consideration the requirements of their national economies. This objective is achieved with adherence to the following principles in the interested countries: unification of information processing forms; creation of prerequisites for a competent solution of the question of using inventions on the basis of unique criteria of selection and content of information on individual objects; establishment of a general procedure of transmission and dissemination of information.

The indicated system is being used by departments concerned with inventions of Bulgaria, Hungary, Vietnam, GDR, Republic of Cuba, Mongolia, Poland, USSR and Czechoslovakia. The Conference of Heads of Departments Concerned with Inventions is constantly directing attention to increasing its effectiveness. During 1977-1982, participating countries turned over to each other 1,272 data on subjects determined on a bilateral basis. During this time, ministries and operational organizations of Bulgaria, GDR, Poland, USSR and Czechoslovakia showed an interest in the use of 138 very important inventions.

Thus GDR and USSR ministries and enterprises showed an interest in the Hungarian patent "Method of Producing Complexes of Vitamin D--Cyclodextrin" and GDR and Czechoslovakia in the Soviet invention "Calcium Salt 1(2-chlorethoxy-carbonyl--Naphthalinsulfo Acid as a Regulator of Potato-Tuber Growth and Formation." In the GDR, an interest was shown in using the Bulgarian patent "A Loading Device for Rod Mills" and in Czechoslovakia--of the GDR patent "Portable Equipment for Screwing Screws in the Upper Part of the Structure of Railroad Tracks."

But the number of inventions introduced into the national economy from other CEMA member countries constitutes so far only a small part of their total number. This, in our view, is manifestly inadequate, for the benefit of utilizing the experience of related enterprises in production is quite appreciable.

For example, at Moscow Motor-Vehicle Plant imeni I.A. Likhachev, the economic effect of introduction of proposals based on the experience of GDR and Czechoslovak enterprises amounted to more than 600,000 rubles a year. Czechoslovak enterprises have now been using for several years with great economic effect a Hungarian patent "Method and Equipment for Improving Turbine Load" and a GDR industrial patent "Method of Increasing the Density of Photographic Halogen Silver Emulsions."

In conformity with the decision of the Conference, the Council's Secretariat compiled and sent to the countries summarized information on the most important inventions of CEMA member countries in the field of chemistry and a similar collection on machine building.

The summarized information on chemistry compiled from data of Hungary, GDR, Poland and the USSR contains 28 data on 33 most important inventions, while the collection on machine building prepared from data of Bulgaria, Hungary, Poland, the USSR and Czechoslovakia contains 105 data on 143 very important inventions. The information and the collection were turned over to the proper permanent commissions of the CEMA, the CEMA Committee on Scientific-Technical Cooperation and the MTsNTI [International Center of Scientific-Technical Information]. The collection on machine building includes in its content 12 fields (in accordance with the structure of the working organs of the CEMA Permanent Commission for Cooperation in the Field of Machine Building). It includes inventions providing a major economic effect from economy of raw materials and energy as well as from higher labor productivity.

For example, the GDR patent "Method and Cutting Tools for the Production of Plates for Electric Motors" provided an annual economic effect of 2.2 million marks, a USSR author's certificate "A Mold for Ingot Casting"--240,000 rubles and a Czechoslovak author's certificate "Conveyor Loading Equipment for Selective Mining"--1.8 million Czechoslovak korunas.

CEMA permanent commissions, particularly for cooperation in the sphere of the chemical industry, in the field of construction, in the field of agriculture, in the field of ferrous and nonferrous metallurgy as well as in the field of transport, adopted measures for acquainting specialists of organs of the

Council and other users with information on very important inventions for the purpose of studying the possibilities of their use, first of all solving questions connected with long-term goal-oriented cooperation programs.

The operation of the system of information exchange provides definite positive results, but under present-day conditions it is necessary to significantly speed up the introduction of very important inventions into production. Therefore for the purpose of expanding cooperation and further activating work, including in the field of information exchange, the Conference of Heads of Departments Concerned with Inventions of CEMA Member Countries is working on a Long-Term Cooperation Program of CEMA Member Countries on Questions of Inventions to 1990 and Basic Measures for Its Realization.

In December 1983, the Conference approved Proposals for Improving Work on Information Exchange on Very Important Inventions and Their Use in the National Economy of CEMA Member Countries and found it advisable to recommend to interested departments concerned with inventions that they be guided by them. The essence of the proposals consists of the following.

For the purpose of improving the quality of selection of inventions, departments concerned with inventions should carry out their purposeful selection, especially for the most urgent directions of cooperation determined by long-term goal-oriented cooperation programs as well as for other programs and decisions of CEMA organs. Scientific-research and operational organizations in which the inventions were developed should be involved in the process of selection, and their technical level is becoming a most important selection criterion.

In order to increase the effectiveness of the exchange system and the topicality of the directed information, departments process and prepare it twice a year and then turn it over to the Council's Secretariat. On this basis, collections are compiled of the most important inventions for the pertinent fields of technology and sent to CEMA organs and international organizations of the CEMA member countries. Departments concerned with inventions in their turn send the collections to national ministries and departments, corresponding operational organizations and also to organs engaged in licensing work.

Information on the most important inventions contains the following data:

designation of the invention or object in which it is contained; number of the author's certificate or patent; international classification index of invention; date of submission of application; state of development and utilization of invention in country of origin with indication of developing organization and utilizing organization, stage of utilization, type and character of production, year of industrial utilization; name and address of organization competent to conduct negotiations; chief qualitative indicators characterizing the technical and economic significance of the invention compared to the world level of the equipment, including expected effect (for example, economy of labor outlays, energy, material, improvement of labor conditions, protection of health and environment, creation of new use properties and so on). In addition, a summary or a brief description of the invention in the Russian language and a sketch are appended.

Improvement of the system of information exchange on most important inventions is aimed at a wider disclosure of useful experience and is in harmony with a serious task facing CEMA organs--to devote more attention to mutual transferring of licenses and know-how among CEMA member countries on the latest achievements of science and technology. This was again emphasized in the course of the work of the 37th CEMA Session.

Inasmuch as under present conditions, the key question of development of material production is rational and economical utilization of all types of resources, special importance is to be attached to the introduction of inventions used in energy- and resource-saving technology, including in agriculture and the food industry.

In 1983, the Council's Secretary put out collecting of the most important inventions of CEMA member countries in the field of economical and rational use of fuel, power and raw-material resources, including secondary resources as well as in the field of agriculture and the food industry and sent them to departments concerned with inventions, CEMA organs and international organizations of the fraternal countries.

They include in particular such very important inventions as:

a GDR industrial patent "Heating Block of Atomizers with Regulation of Pressure for Highly Viscous Fuel Oils" (replacement of light oils, possibility of their use for another purpose);

patent of the Republic of Cuba "Method of Measuring a Concrete Mixture" (18-percent reduction of cement expenditure);

USSR author's certificate "Horizontal Forging Machine" (25-percent saving of electric power);

Czechoslovak author's certificate "Nozzles Without Bleeding Pipe for Heavy-Fuel Engines with Self-Ignition from Compression" (saving of material and energy of up to 30 percent);

Czechoslovak author's certificate "Pump Intake Basket" (10-20 percent saving of electric power).

In agriculture and the food industry, there were selected and proposed, for example:

USSR author's certificate "Method of Fodder Production (saving of up to 60 percent of fodder in mass with high average additional daily weight);

application for Czechoslovak author's certificate "Device for Physical-Chemical Cleaning of Straw" (less expenditure of power per ton of cleaned straw compared to items of identical capacity of foreign firms);

Czechoslovak author's certificate "Self-Propelled Machine for Mechanization of Cultivation of Fodder Crops on Inclines."

All these inventions have been patented abroad, including in a number of capitalist countries.

Regularly held international exhibitions contribute to broad informing of the fraternal countries' scientific and technical community on achievements in the field of invention and rationalization. Thus major interest has been created by the INVEKS [not further identified] exhibition of inventions and technical innovations held every 2 years since 1970 in Czechoslovakia (Brno). At INVEKS-82, more than 1,500 exhibits were shown from Bulgaria, Hungary, the GDR, Poland, the USSR and Czechoslovakia. The exhibition is not only of informative and propagandistic value, commercial agreements are concluded there, including those dealing with the sale of licenses.

The Patentinform Exhibition regularly held in Budapest is quiet interesting.- Here main attention is concentrated on achievements of CEMA member countries in the field of patent information and documentation.

In the summer of 1983 the Soviet Invention and Rationalization-83 Exhibition was held on the grounds of the Exhibition of USSR National-Economic Achievements in Moscow. USSR ministries and departments took part in it that had demonstrated success in power engineering, instrument making, machine building, chemistry, construction, the agroindustrial complex, protection of the environment and so forth. A total of about 5,000 exhibits was shown, 90 percent of which were admitted as inventions. Organizations and enterprises of Bulgaria, Hungary, Vietnam, GDR, Poland, Romania, Czechoslovakia and Finland also participated in the exhibition.

The holding of such exhibitions contributes to wider exchange of advanced experience and speedier use of inventions and technical innovations in the economies of the fraternal countries. In this connection, departments concerned with inventions of CEMA member countries plan to participate even more actively in international exhibitions.

The introduction of very important inventions brings about a rise in the technical level of production output and its high quality. The use of scientific-technical solutions in production, the special technical and economic value of which has been confirmed in practice, provides the possibility of assuming leading positions in one or another field of technology, setting up the production of competitive products and exporting highly efficient technology on the basis of licenses.

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## ECONOMIC GAINS FROM INDUSTRIAL USE OF CEMA STANDARDS BY MEMBER STATES

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 2,  
Feb 84 p 77

[Unsigned article: "Cooperation of CEMA Member Countries in the Field of Standardization"]

[Text] One of the ways of improving economic and scientific-technical interaction of CEMA member countries is cooperation in the field of standardization, which is intended to fulfill the role of an instrument of development of specialization and cooperation, higher production efficiency and higher production quality in these countries and its competitiveness in the world market.

A brochure prepared on the basis of materials of CEMA member countries and the Council traces the stages of cooperation and throws light on the basis of planned development of standardization within the CEMA framework. It shows the expanded role of standardization since the adoption of the Complex Program and illuminates the importance of the CEMA Standard as a basic normative-technical document on standardization within the CEMA framework. It is pointed out that a large body of CEMA standards has been developed for the purpose of fulfillment of the targets of the Complex Program. The objects of standardization are general technical norms used in machine building, technical systems, equipment, components and parts of the intersectorial type. Thus CEMA standards number 200; they establish basic parameters, dimensions, technical and other requirements for metal-cutting tools.

In the publication, tasks are examined in detail that were introduced with the development of long-term goal-oriented cooperation programs and the creation of a corresponding normative-technical base for support of the measures provided in them. The development and introduction of complexes of CEMA standards are shown that exert a direct influence on the realization of the outlined measures and also improvement of basic technical-economic indicators of production output, serving as the object of cooperation. Since 1979, about 50 percent of all annually approved CEMA standards have been designated for standardized support of the concrete measures of long-term goal-oriented cooperation programs.

It is pointed out in the brochure that the employment of CEMA standards in the national economy provides a considerable economic results and contributes to

bolstering the effectiveness of national standardization. Thus the economic effect from the introduction in Bulgaria's machine building of CEMA standards for hydraulic drives, electric purchases, small motor trucks, tractors and brake shoes for railroad cars adds up to 4,360,000 leva. The use of CEMA standards for thyristor electric drives and norms for expenditure of electric power for arc and induction furnaces made it possible to reduce expenditure of electric power by 454 million kilowatt-hours. The annual economic effect from the introduction of CEMA standards in Hungary for tractors and agricultural machines amounts to 1,350,000 forints. In the USSR, CEMA standards for brush holders of electrical machines at plants of the Ministry of Ferrous Metallurgy produced an annual economic effect of 15 billion rubles.

Considerable attention is given in the brochure to complexes of CEMA general technical standards, which are widely used in working up technical documentation for objects of cooperation: The Unified System of Planning and Design Documentation, The Unified System of Tolerances and Fits and Standards for Labor and Environmental Safety Practices.

By establishing high requirements for manufactured and mutually supplied products and interchangeability and technical compatibility, standardization becomes an important factor for increasing effectiveness of specialization and cooperation of production and expansion of economic and scientific-technical cooperation of CEMA member countries.

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REPORT ON GENERAL ASSEMBLY OF LATVIAN SSR ACADEMY OF SCIENCES

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 83 pp 3-11

[Article by Ya. Kristapson]

[Text] A session of the academy's General Assembly was held on 10 November 1983; discussed at the meeting were the tasks facing the Latvian SSR Academy of Sciences in connection with carrying out the decisions of the June (1983) Plenum of the CPSU Central Committee.

Participating in the General Assembly session were I. A. Anderson, secretary of the CPLA Central Committee; E. M. Ozols, chairman of the LaSSR Committee of People's Control; V. A. Blum, chairman of the Presidium of the LaSSR Supreme Soviet; V. M. Krumin' and M. L. Raman, deputy chairmen of the LaSSR Council of Ministers; V. S. Klibik, chief of the Science and Education Institutions Department of the CPLA Central Committee; and others.

In addition to members of the academy and its leading associates, leading scientists and social scientists from VUZes and other scientific institutions and representatives of party, trade union, and Komsomol organizations at academic institutions were invited to the session.

Academician A. K. Malmeyster, president of the LaSSR Academy of Sciences, opened the session of the General Assembly.

Those attending the session heard a report given by Academician A. K. Malmeyster, president of the academy, "On the Goals of the LaSSR Academy of Sciences for Fulfilling the Decisions of the Party and Government on Science and Scientific and Technical Progress."

In his speech, the president noted that the party and government are devoting a great deal of attention to problems involving the acceleration of scientific and technical progress. The corresponding directive documents in essence pursue a single, common goal: to create the necessary conditions for effective development of science and technology, raising the level of research and development, and making extensive utilization of these factors in the national economy. The November (1982) and June (1983) Plenums of the CPSU Central Committee devoted a considerable amount of attention to these issues and comrade Yu. V. Andropov, general secretary of the CPSU Central Committee, stressed these issues in his speeches at the Plenums and in his meeting with

party and labor veterans. The well-known decree issued by the CPSU Central Committee and the USSR Council of Ministers "On Measures to Accelerate Scientific and Technical Progress in the National Economy" is another embodiment of the decisions of the Plenums of the CPSU Central Committee and the directives of comrade Yu. V. Andropov. This document clearly defines the tasks of scientific institutions, enterprises, ministries, and departments--both immediate, top priority tasks and long-range goals. A. K. Malmeyster went on to say that this is a very important document which for the most part applies to production workers as well, and describes how they should utilize scientific achievements. Only high quality, top grade goods should be produced. The measures called for in the decree should encourage workers in industry and agriculture to turn to scientific institutions and scientists for joint work. The decree issued by the CPSU Central Committee and the USSR Council of Ministers assigns the USSR State Planning Committee, the State Committee for Science and Technology, the USSR Academy of Sciences, and a number of other ministries and departments, the task of working out the following measures within a period of six months.

The party has set the goal of combining in practice the advantages of the socialist system and the achievements of the scientific and technical revolution. Today this issue is of especially great importance because the development of science and technology has become one of the basic directions in the competition between the socialist and capitalist systems.

At the June Plenum comrade Yu. V. Andropov provided a clear, concise formulation of the goals for the future development of real socialism: "It is widely known that the face of every society is, in the final analysis, determined by the level of development of its productive forces and the character and condition of production relations. In our social development we have now reached an historic point when profound qualitative changes in the productive forces are not only imminent, but are becoming inevitable; these changes will bring about a corresponding improvement in production relations. This is not simply our desire, comrades, it is also an objective necessity; there is no way for us to get around it. In close connection with this, changes should also take place in people's consciousness and in all forms of social life, which are part of the so-called superstructure."

The academy's president went on to describe specific aspects in the development of the LaSSR Academy of Sciences over recent years. He said, "In the past ten years the number of people working in the academy has doubled. This has occurred as a result of a systematic, yearly allocation of funds from the government's reserves; these funds, as a rule, are earmarked for the completion of applied research that has already been started. We have been able to increase the number of people working at social sciences institutes (they now account for approximately 12 percent of the total number of people working in the academy) and we have even managed to organize a new Philosophy and Law Institute. The efforts of chemistry, biology, physics, and technical institutes are concentrated primarily in applied research. Many laboratories are performing fundamental research, which, one would hope, will provide a foundation for new, original applied developments in the future.

"The results of research in a number of important, current directions in scientific and technical progress are having a positive effect on the development of various sectors of the USSR national economy as a whole and the national economy of the LaSSR as well. These directions include: composite polymer materials and articles made from them; materials and industrial processes based on plasma chemistry of inorganic compounds; research on magnetic hydrodynamics with the aim of developing new processes, machinery, and equipment; intensification of agricultural production (the republic's Food Program); development of new preparations for medicine and veterinary science; the development of the fuel and power complex; multi-machine computer systems and networks; semiconductor technology; processing and utilization of timber; protecting metals against corrosion; and improving the economic management mechanism.

"During the first two and a half years of the 11th Five-Year Plan, 308 of the academy's developments have been introduced into the country's national economy, 145 of them in the republic. Research valued at 15.1 million rubles has been carried out under 447 economic agreements. Each year over 300 agreements on scientific and technical cooperation were carried out. A total of 12 foreign trade agreements (licenses) were concluded and carried out successfully. As a foundation for further developments, 350 new inventions were made. Important work has been done within the academy on the creation and development of agro-industrial associations, which are in operation today in all the regions of the republic. The Comprehensive Program for Scientific and Technical Progress in the Latvian SSR for 1986-2005 (and subsequently for 1991-2010) is of great importance for the republic's future development; the academy played an active role in working out this program."

A. K. Malmeyster stressed, "We would be able to make a significant increase in our contribution to scientific and technical progress, but we are encountering the key problem that was mentioned in the recent decree issued by the CPSU Central Committee 'On the Work of the Ural Scientific Center of the USSR Academy of Sciences.' The issue is the expansion and strengthening of the testing and experimental base for research. The state has allocated a considerable amount of money to our academy for this purpose. The Ministry of Construction, however, is not doing a satisfactory job of fulfilling work plans at projects for the republic's Academy of Sciences.

"We must work every day to eliminate shortcomings in our work and to make full utilization of all our reserves, possibilities, and scientific potential. We must take full responsibility and admit that our coordinating councils for combined scientific and technical programs have still not reached an active level of operation. The application of special program planning for the development of science and technology, in accordance with the decree issued by the CPSU Central Committee and the USSR Council of Ministers on scientific and technical progress, is expanding. Starting with the 12th Five-Year Plan, the following basic types of scientific and technical programs for resolving the most important problems in science and technology will be in effect: all-union, republic, sectorial, and regional. The goals of these programs will be included in the state five-year plans and annual plans. In order to meet the demands made on science by the decree issued by the CPSU Central Committee and the Council of Ministers, we must provide high-quality proposals for the

national economy. Consequently, these proposals must contain new technical solutions, or inventions. We have had some major difficulties in creating sectorial laboratories for various sectors of the national economy: during the 11th Five-Year Plan several such laboratories were organized. This requires both the proper initiative and persistence on the part of our institutes, as well as interest in and understanding of the importance of these organizational forms on the part of the ministries."

A. K. Malmeyster, president of the LaSSR Academy of Sciences, continued, "Therefore, the most important task of our academy and all its institutions is to make fundamental improvements in the work being done to accelerate scientific and technical progress and to carry out the measures outlined in the decree of the CPSU Central Committee and the USSR Council of Ministers 'On Measures to Accelerate Scientific and Technical Progress in the National Economy.' The academy and its institutions should intensify the research being done on the most urgent practical issues."

The president went on to discuss a number of issues in publishing in light of the decisions of the June Plenum of the CPSU Central Committee. The LaSSR Academy of Sciences publishes eight journals, but only one of them contains work in the social sciences. Unfortunately, the "Zinatne" publishing house and its director, Yu. B. Brok, have made a number of miscalculations in fulfilling the production and financial plan, and the publication of scientific literature has suffered. A more careful approach must be taken to selecting books for mass publication.

A. K. Malmeyster also spoke about issues in counterpropaganda.

The president said, "The ideology of the class enemy can penetrate people's consciousness in different ways: there are the holdovers from the bourgeois system, and the flagrant contemporary imperialist propaganda, based on lies and misinformation. Anti-communism and slander directed against socialism, the Soviet Union, and the Soviet people are the usual content of imperialist propaganda. In light of this, literary criticism plays a very important role. This is one of the primary tasks of the Language and Literature Institute imeni A. Upit."

The president emphasized, "Considering the course of the scientific and technical revolution, and in accordance with the development of productive forces and production relations, we should be constantly improving our society's superstructure. Therefore, the June Plenum of the CPSU Central Committee focused attention on urgent issues in the party's ideological and mass political work. It is not just communists who need to understand the party's policies. It is most important that all our people be armed with the ideals of communism. This is the primary goal of our ideological work."

"The materials of the June Plenum of the CPSU Central Committee have been discussed at our institutes, academic councils, party meetings, at meetings of the general assemblies of the academy's departments, and repeatedly by the academy's Presidium. Work to carry out the decisions of the Plenum and the directives of comrade Yu. V. Andropov is now at the top of the list of all our

future goals. I am sure," the president said, "that the academy's associates will do an honorable job of meeting these goals."

In conclusion, Academician A. K. Malmeyster said, "We are now living at a time when the international situation is very tense. Ronald Reagan, following the orders of his bosses, has declared a crusade against communism. The United States is deploying its missiles in Western Europe. The CPSU, the Soviet Union, Soviet people, Soviet scientists, and scientists of Soviet Latvia are standing up for peace, and for a peaceful resolution to all issues. The fulfillment of the decisions of the June Plenum of the CPSU Central Committee will be our contribution to the campaign for disarmament and peace."

Academician V. A. Shteynberg, academician secretary of the Social Sciences Department, presented a report titled "Urgent Issues in Social Sciences in the Republic in Light of the Decisions of the June (1983) Plenum of the CPSU Central Committee and the June (1983) Plenum of the CPLA Central Committee." Academician V. A. Shteynberg said, "The development of social sciences is dictated by the demands of our dynamic era, the epoch of the transition from capitalism to socialism; and by the fundamentally new needs in a society of developed socialism. The CPSU has offered a remarkable example of in-depth understanding of natural social laws, and the demands of economic, spiritual, and ideological development in the decades during which we live. The party has come out with a well-developed program of action: the June (1982) Plenum of the CPSU Central Committee was an important event in the life of our party and our state, and in the life of all Soviet people. The subsequent July Plenum of the CPLA Central Committee thoroughly analyzed the status of social science research in the republic and proposed measures that are of great importance for the further development of scientific research and for resolving urgent issues in ideological and mass political work in the republic. The Plenum of the CPLA Central Committee suggested to a number of organizations and institutions, including our academy's Presidium and Social Sciences Department, that they 'devote more attention to issues of planning and effective organization of scientific research on the phenomena and processes of social life at the stage of developed socialism, and to increase their demands for proper style and methods of operation among scientific collectives.' In his report to the Plenum of the CPLA Central Committee, comrade A. E. Voss, first secretary of the CPLA Central Committee, offered some justified criticism of the Language and Literature Institute imeni A. Upit; the institute is still not devoting enough attention to research on problems of literary and dramatic criticism and to exposing bourgeois emigrant conceptions of the development of Latvian culture, including the period of developed socialism, about which anti-Soviet forces in the West are trying to speculate.

"Social scientists in the academy and the republic, guided by the decisions of the 26th CPSU Congress, have made a contribution to the study of important contemporary problems and have helped formulate the idea of developed socialism. This was the result of a study of the Latvian people, the revolutionary struggle of Latvia's working masses, and the immense political and social achievements that have been reflected in the construction of socialism and communism on Latvian land. On the whole, successful work is being done in the study of a number of practical processes in economics, international events, the Latvian language, bilingual issues, cultural

heritage, and some of the most important problems of dialectical and historical materialism. Proper recognition and praise is given to all the fruitful work done by social scientists. Some of the practical proposals have been implemented.

"At the same time, greater demands are now being made on the social sciences. The party is calling for a decisive turn 'to real, practical tasks that life sets before our society.'" Academician V. A. Shteynberg stressed, "All this demands a decisive, and in many cases, a radical change in the work done to organize research in the social sciences, and even in the research itself, aiming it toward final results which express fundamental conclusions and real, practical proposals."

Academician V. A. Shteynberg went on to say, "During the time that has passed since the June (1983) Plenum of the CPSU Central Committee, social science institutes have corrected and made substantial changes in their operating plans and they have taken measures to concentrate their efforts on the most urgent research. The academy's Presidium heard individual reports from each humanities institute. On the whole we can be satisfied with the work that has been done. However, we will not judge the work by how the corrected plans look, but by the results of fulfilling these plans. The correction of the plans will provide the corresponding practical results, as well as specific recommendations."

V. A. Shteynberg described a number of important points in the work of social scientists. He said, "Up until now, the situation has been that the 'thick', multi-volume works receive priority and the highest evaluations. However, it is important not only to reveal the truth, but also to express it accurately and in an accessible manner. Furthermore, the authors of major scientific works should seek ways to bring their achievements to a broad circle of readers, primarily by publishing 'thin' volumes of popular scientific works.

"Representatives of the social sciences, who have a thorough knowledge of the processes of social development, should be active participants in counterpropaganda. They are the ones who should prepare the materials needed for special lectures on counterpropaganda, in addition to counterpropaganda methods. All institutes and social scientists in the republic, as well as the Social Sciences Information Center, the Fundamental Library, scientific councils, and societies under the Social Sciences Department, should contribute to this work.

"We would still like to see highly skilled personnel do a better job of working out problems of developed socialism. The institutes are not doing enough work on the complex problem of training doctors of sciences. The average age of doctors of social sciences is very high. Some scholars study the same question for years on end, and even though a specialist may reach an optimal level of understanding of the problem, he does not go any further, he does not start working on new problems. If we are discussing reorganization of this work, then timely redirection of some of our scientists toward more urgent, contemporary topics is certainly an element of this reorganization.

"We should be doing everything possible to bring the importance and role of social sciences up to meet the contemporary demands."

Participating in the discussion of the reports were V. M. Krumin', deputy chairman of the LaSSR Council of Ministers; academicians A. P. Grigulis, B. A. Purin, and R. Ya. Karklin'; and V. O. Miller and V. V. Doroshenko, corresponding members of the LaSSR Academy of Sciences.

In his comments, V. M. Krumin', deputy chairman of the LaSSR Council of Ministers, pointed out that the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures to Accelerate Scientific and Technical Progress in the National Economy" also contains recommendations for new organizational structures and makes new demands on the entire "science--production" cycle. V. M. Krumin' said, "It is necessary to realize fully our scientific potential, our economic potential, and all our possibilities. We are now talking about making fundamental improvements in the management of the national economy and in its planning. We must establish firm ties between the criteria used to evaluate our work and the quality and time period of the final results. We need to increase operating efficiency and discipline in all sectors of the national economy. This is a demand that was issued by the 26th CPSU Congress, and the November (1982) and June (1983) Plenums of the CPSU Central Committee. All this is of direct concern to all the scientific collectives in the country, and of course, our republic."

V. M. Krumin' continued, "Over the past 20 years fundamental changes have taken place in the organizational structure and territorial distribution of scientific institutions and production enterprises. The task is to develop and implement the optimal method for formulating research topics in republic scientific organizations and to make the most effective use of the possibilities of cooperation with other regions and sectorial institutes. Our academy is now one of the most effective in the USSR in terms of the results of its scientific research. The academy's collective and scientists at the republic's VUZes earn the highest praise, but life, as was mentioned earlier, is constantly making new and greater demands. We must take a more in-depth and objective approach to urgent problems in the development of the republic's national economy. In light of the new demands, we need to return to the question of taking stock of the topics being studied. It is impossible to expand the range of research topics limitlessly. Once every three years the academy's Presidium reviews and evaluates the activity of each the academy's institutes. These analyses and evaluations should be more demanding, in order to concentrate efforts on the most important and promising research, and to discontinue research on unnecessary topics. There are a number of issues that are not being given sufficient attention in the republic today. Scientists' efforts need to be concentrated on implementation of the special combined program on waste-free utilization of timber and forestry. The republic has geothermal water and natural brine areas--can we make use of them in some way? The republic has a highly developed electronics industry, but we should think about what consumer products other than radio receivers and phonographs could be produced by the republic's industry. All this involves planning of scientific work. We need to plan the course of applied projects, their completion and implementation. We see in the annual plans for scientific work that the most popular category in the 'Completion Deadlines' chart is,

unfortunately, 'work in progress'; that is, the work has been started, but not finished.

"We must do everything possible to increase personal responsibility among scientists and all the members of research collectives for the final result of their work. We are referring to the scientist's self-awareness and self-discipline. Dedicated, gifted, and enterprising scientists should be given the most favorable working conditions. These people need to be supported in every way possible, and there are quite a few forms of moral and material incentives to accomplish this.

"The decree of the CPSU Central Committee 'On the Work of the Ural Scientific Center of the USSR Academy of Sciences' contained harsh criticism of the Ural Center for its inadequate coordination of scientific research operations in the region. Efficient coordination is a very promising way to concentrate scientists' efforts on resolving the major important tasks and it eliminates isolation among scientists and the practice of working just for oneself. Today the role of special combined programs is growing rapidly. The Academy of Sciences, its Presidium, departments, and councils should play a primary role in coordinating and carrying out this work," said V. M. Krumin'.

"The republic's Council of Ministers is involved in construction issues on a daily basis. There is confidence that next year will be a crucial year in the work of construction workers, as well as in the construction materials industry; this will also have an effect on the construction of academy projects.

"The academy has four experimental production facilities. They must be utilized in a more thoughtful and efficient way. Attention must also be given to organizing scientific experimental sections right at regular production facilities, both at the expense of the corresponding ministries and departments and of the academy. Every ministry and department has real opportunities to do this. The republic's government will support any rational initiative in this direction."

Academician A. P. Grigulis, people's writer of the LaSSR, said in his speech, "The role of literature in the formation of people's consciousness was proven long ago. The July (1983) Plenum of the CPLA Central Committee devoted a great deal of attention to issues in art and literature. This is a very timely matter. We, as specialists in literature, sometimes lose our keenness in evaluating the life of our society. For example, in the last decade it is difficult to find in literature an example of the Komsomol hero. During the Great Patriotic War and after the war, male and female Komsomol members were the main heroes in literary works. The July Plenum of the CPLA Central Committee, and the report given there by comrade A. E. Voss, stirred up the republic's family of writers and had definite results. The problem is to keep this from being just a passing concern."

Academician A. P. Grigulis spoke in detail about issues in literary criticism in the republic. He stressed, "Recently there have been no serious critical works, and the VUZes have not produced a single notable literary critic. There is a foundation in the VUZes for educating literary critics, but this

foundation needs to be developed further. Today publications such as the newspaper PADOM'YU YAUNATNE and the journal LIESMA are not publishing any literary criticism materials. If some kind of review does appear, it is accidental. The journal KARGOS devotes very little space to literary criticism and reviews, and the quality of these features in the newspaper LITERATURA UN MAKSLA is very low. Literary criticism is the key to the future active development of literature."

In his presentation Academician B. A. Purin said, "At a meeting of the department's general assembly, scientists of the Chemical and Biological Sciences Department discussed in detail the goals set by the June (1983) Plenum of the CPSU Central Committee and the decree of the CPSU Central Committee and the USSR Council of Ministers on accelerating scientific and technical progress. When planning our topics, we should take into account the goals of the special combined programs, the various decisions of directive agencies for developing specific sectors of science and technology, as well as the fact that our institutes carry out a certain proportion of the research done in the USSR and must do so at a level that meets the world standard. The practical results of our research should be utilized first and foremost right here in our own republic. We need to improve the coordination of research with sectorial institutes, which in terms of the total number of staff members exceed the corresponding academic institutions."

B. A. Purin continued, "The republic has done a great deal to create an experimental base for the academy. However, at the same time a certain scientific potential has developed and today our scientific forces have already outgrown the existing experimental base by a considerable margin. The time spent on building projects for the academy has been dragged out inexcusably. Also discussed at the meeting of the department's general assembly was the need to modernize the existing experimental base. Modernization must take into account utilization of computer technology. Here we are counting on cooperation with our academy's Electronics and Computer Technology Institute." In conclusion, Academician B. A. Purin assured the academy's General Assembly that scientists in the Chemical and Biological Sciences Department will do an honorable job of fulfilling the goals that have been set before them.

In his speech, Academician R. Ya. Karklin' said, "The Microbiology Institute imeni Avgust Kirkhenshteyn and its experimental plant are devoting a great deal of attention to bringing developments in molecular biology and biotechnology into industrial production. Some important work has been done in the selection of new cultures of microorganisms and in developing techniques for obtaining biologically active substances for agriculture, industry, and medicine. The most active producers of citric acid in the world have been obtained here; they provide the highest level of biosynthesis, even higher than that produced by products of the "Pfizer" company (United States), the largest manufacturer of this substance. The selected producer strains have a yield of citric acid of up to 100 percent under laboratory conditions and of 75-80 percent under industrial conditions. After the new active cultures of the microorganisms were introduced extensively throughout the USSR, they were offered for sale on the international market. The Biochemical Preparations Experimental Plant has already sold licenses to firms in six different countries--Czechoslovakia, Bulgaria, Yugoslavia, France, Turkey, and the FRG."

Academician R. Ya. Karklin' went on to say, "The export of microbiology licenses is somewhat different from the export of finished products or raw materials. This is due to the specific nature of the licensing object (the producer strain has no analogues); another factor is that it is not always possible to determine the exact profit that the purchaser of the license will obtain by using the strain. Therefore, reliable information is needed to make a correct evaluation of the situation. Our experience allows us to draw a conclusion about the possibility of further expanding the export of licenses in this area.

"The creation of waste-free microbiological production processes is an important factor in the conservation and rational utilization of resources, which includes recycling of resources, and in protecting the environment from pollution. This is a task facing specialists who are working on the development of all industrial biotechnology. The Biochemical Preparations Experimental Plant makes full utilization of production wastes--mycelia and filtrate--and has thus increased the output of agricultural preparations, such as biological stimulants and premixes, that are being used successfully at farms in the republic."

V. O. Miller, rector of the Latvian State University imeni P. Stuchka and corresponding member of the LaSSR Academy of Sciences, said in his presentation that VUZes are becoming more and more important as scientific research centers. When research topics are reviewed at the university, special attention is given to the immediacy of the work, so that problems in the theory and practice of a developed socialist society are dealt with first, and so that every scientific project, especially in the social sciences, has a significant ideological character.

V. O. Miller spoke in detail on the research being done by the republic's legal specialists. He said, "There are more than 40 of these specialists who are engaged in scientific research, along with teaching and other work; 11 of them are doctors of science and about 30 are candidates of science. One of the top priority goals set by the June (1983) Plenum of the CPSU Central Committee is improvement of the economic and political system of developed socialism; the legal sciences are to play an important role in fulfilling these tasks. The republic's legal experts have concentrated their efforts on the following topics: first, the study of the natural laws governing the formation and development of the Soviet state system in Latvia. This topic is one of the most crucial in the ideological struggle. This type of research also has a deeply practical character, since all Soviet and party workers, and workers on the ideological front should know not only the history of the formation of the state system in Soviet Latvia, but also the basic trends in its contemporary development; and they should take these trends into consideration in their practical work. Another problem being pursued by the legal specialists is the study of the history and the theory of the Constitution of the Latvian SSR. Specifically, they are studying the mechanism of operation of the 1978 Constitution. The republic's jurists are also faced with major tasks in the study of crime and in determining the theoretical aspects behind the prevention of crime as a social phenomenon. Work is also being done to resolve important issues in improving civil, family, labor, economic, and environmental

protection legislation. The Philosophy and Law Institute has begun research on problems of legal and precautionary foundations for special combined programs. Legal science, an integral part of the social sciences, should become in our republic a more effective means of helping the party and the state to resolve specific problems of developed socialism," V. O. Miller, corresponding member of the LaSSR Academy of Sciences, said in conclusion.

V. V. Doroshenko, corresponding member of the LaSSR Academy of Sciences, spoke about the work being done in methodological (philosophical) seminars held at the academy's institutes. "There are 25 such seminars operating within the academy, with a total of about 800 participants. The basic direction of their work is to provide a seminar-oriented, theoretical foundation for scientific research, that is, the methodology of the scientific quest in each given sector of science. The goal of the seminars is to reveal new approaches to resolving a scientific problem. The value of the discussions is that we can ascertain how far we have advanced in research on assigned problems. Without continuous renewal of the theoretical tools (including not just general principles, but also research techniques), we really do not have science at all," V. V. Doroshenko stressed. He cited several examples of good seminars and pointed out that pressing issues in the life of our country were the topic of discussion at these seminars. He said that many leading scientists, including members of the academy and directors and assistant directors of scientific projects, participate actively in the seminars. Intensifying the cooperation between representatives of the social and natural sciences is especially important in the future success of the seminars. Methodological (philosophical) seminars are the optimal form for accomplishing this.

V. V. Doroshenko also discussed a number of issues concerning the future development of social sciences. He said, "The in-depth study of contemporary social processes by historians and sociologists is very important. A scientific approach must be taken to the study of the society of developed socialism, taking into account the entire set of facts, in the words of V. I. Lenin, 'without a single exception.' One can sometimes get the impression that a scientist is not concerned with the essence of a question, but with some indirect considerations, such as its 'passability' or its dissertation potential; that is, the same shortcoming discussed at the June (1983) Plenum of the CPSU Central Committee."

The General Assembly adopted a decree which defined the tasks of the academy's Presidium, departments, and institutions for fulfilling the decisions of the June (1983) Plenum of the CPSU Central Committee and the decisions of the party and the government regarding science and scientific and technical progress.

The participants in the meeting of the General Assembly expressed unanimous approval of and support for the foreign and domestic policies of the CPSU and the party's course for preserving peace and preventing thermonuclear war.

The General Assembly of the Latvian SSR Academy of Sciences expressed firm confidence that the collectives of the academy's institutions will direct all

their creative energy toward the successful and complete fulfillment of the decisions of the June (1983) Plenum of the CPSU Central Committee.

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## MORE EFFECTIVE TRAINING URGED FOR PERSONNEL AT BRANCH RESEARCH INSTITUTES

Vilnius SOVETSKAYA LITVA in Russian 27 Mar 84 p 1

[Article from Lithuanian news agency EL'TA: "Show More Concern for Training of Scientific Cadres"]

[Text] In our lifetime science has become a direct productive force, without which further progress for society is unthinkable. At a meeting with the electors, General Secretary of the CPSU Central Committee K.U. Chernenko noted that: "It is absolutely necessary that we support the rapid and uninterrupted renovation of all branches of the national economy on the basis of the latest achievements of science and technology. This is one of our fundamental tasks."

Scientists of Soviet Lithuania, including the collectives of the branch scientific research institutes [SRI], are making an increasingly significant contribution to the development of the national economy. The work of the Vilnius branch of the All Union Experimental Scientific Research Institute for Metal-cutting Machine Tools [ENIIMS], as well as that of the SRI of the textile industry, the All Union Institute of Applied Enzymology, the SRI for Construction and Architecture, the All Union Thermal Insulation SRI, "Teplo-izolyatsiya," and others, has been introduced at enterprises and production associations of not only our republic, but also those of our fraternal republics. Many of these projects have been carried out on a high scientific and technical level, and certificates of patent have been issued for inventions. The Vilnius branch of ENIIMS has received 112 certificates of patent. Practically every research topic studied at the SRI for Applied Enzymology has yielded two or three inventions. Specialists are working creatively at the Vilnius Department of the All-Union Planning, Designing and Engineering Institute of Electric Welding Equipment: establishing firm ties with industry, their achievements have resulted in a return to the national economy of 25 rubles for every ruble invested in their scientific research work.

At the session of the republic commission on scientific cadres at the Central Committee of the Lithuanian Communist Party [CPLi], which was held in Vilnius, there was detailed discussion of the increasing role of branch scientific research establishments in the matter of accelerating scientific and technical progress. A great deal of special attention was given to problems of training scientific cadres with the highest skills at branch

SRI and at the SRI with an engineering profile. Questions of communist education of scientists and their ideological tempering were given extensive treatment. After all, to a significant degree the end results of the work of the scientific collectives, and their future prospects, depend on the kind of qualification, the level and the state of political preparedness of the specialists who work on the front lines of economic progress.

Reports were delivered by: A. Gapshis, director of the Vilnius branch of ENIIMS; L. Korol'kovas, director of the SRI for Electrography; B. Vektaris, director of the SRI for Construction and Architecture; and by A. Kaminskas, director of the SRI for Thermal Insulation and member of the republic commission for scientific cadres at the CPLi Central Committee.

These speakers, as well as Yu. Matulis, president of the Lithuanian SSR Academy of Sciences; Academician Z. Yanushkyavichyus, rector of the Kaunas Medical Institute; and others, noted that the situation with respect to training scientific cadres in branch institutes with an engineering profile is not favorable. The fact that the average age of the scientific cadres is noticeably increasing, and not only in the branch institutes, is a matter of concern. The average age of a doctor of sciences is 56 years, and candidate dissertations are now being defended by scientific associates of an increasingly older age group. It is especially difficult to train doctors of sciences in scientific research establishments with an engineering profile. In the last three years only three have been trained there, and only seven doctors of sciences in all are working in them. This cannot but be a cause for concern. It goes without saying that the fundamental base for training scientists of the highest calibre must continue to be the Academy of Sciences and the VUZ's--for whom, incidentally, these shortcomings are also characteristic. However, there are especially great reserves for improving this work in the branch institutes.

What should be undertaken in order to get matters moving in this area? In the opinion of the commission, it is necessary first of all to improve the work with the young specialists, and to show more concern for agitation of the young people in the collectives, to improve their skills and the theoretical level of the scientific work which they perform. It is sensible to plan research work in such a manner to simultaneously lay the foundation on a profound theoretical basis, in order that the dissertations be prepared on topics developed in the collectives. Unfortunately, as of the present time, the topics in the institutes are frequently limited to the solution of technical questions, with no concern for in-depth research and development of the problems in a theoretical respect. It goes without saying that such work can hardly be the basis for a candidate's dissertation, not to mention a doctoral dissertation.

Long-range planning of training of scientific cadres is also a necessity. Each institute should work out long-term plans for training candidates and doctors of sciences, and control their fulfillment in the strictest manner. The institute administrations and their social organizations are obliged to render more effective assistance to those workers who are preparing their dissertations, especially in testing the results of an experiment under industrial conditions, and putting them into practice.

In view of the fact that the branch institutes provide an especially large amount of support to applied works and to putting them into practice, the most outstanding and highly-skilled specialists frequently do not have time to focus more profoundly, to interpret and to summarize that which they have accomplished. The commission directed its attention to the fact that it would be fitting to create all the conditions for scientific assistance to such workers, and to provide advice on the scene, at the institute or at another scientific establishment. It would also be sensible to set up two-year fellowships for doctoral candidates at the branch institutes, and to make it possible for the doctors of science who work there to teach in the higher educational establishments. This would benefit both the institutes and the VUZ's, whose students would receive the latest knowledge in the specialty.

Specialists who are working on their dissertations in the branch institutes are quite often hampered by the lack in these establishments of a sufficiently strong experimental base--the apparatus and instruments necessary for conducting research. The speakers at the meeting proposed a solution: set up a certain type of loan station containing equipment of the scientific, scientific research establishments and VUZ's, so that in case of need these organizations can, upon request, offer the workers in the branch institutes the opportunity to utilize their experimental base and apparatus.

Speakers at the session accentuated the fact that the Lithuanian SSR Academy of Sciences and the republic Ministry of Higher and Secondary Special Education have been summoned to render more significant scientific and methodological assistance to the specialists who work at the branch institutes and who are preparing their doctoral dissertations. In the opinion of the commission, it would be sensible to establish permanent scientific consultants and mentors at each institute. And it was recommended that the branch institutes send more specialists to the Academy of Sciences and the VUZ's for a fixed body of research studies.

Speaking at the session was L. Shepetis, chairman of the republic commission on scientific cadres at the CPLi Central Committee and secretary of the CPLi Central Committee.

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## SPECIALISTS DISCUSS SOCIOECONOMIC IMPACT OF ROBOT TECHNOLOGY

Moscow LITERATURNAYA GAZETA in Russian No 7, 15 Feb 84 p 11

[Roundtable discussion conducted by L. Khar'kova under the rubric "Science: Achievements and Problems": "Work for the Robot. There Are Now Tens of Thousands of Them in the World, and Soon There Will Be Millions. Is This a Good Thing or a Bad Thing?"]

[Text] "One robot, eight or more NC machine tools, and a minicomputer to coordinate operations: this is the kind of 'family' that will soon take over the entire world." This is what Tokyo University professor Tosio Sato thinks. There is a special reason for listening to his opinion: Japan has an undisputed lead in the world in robotization. And it has also been the world's first country to feel the full bitterness of the unresolved social problems engendered or exacerbated by the automation of production. Suffice it to recall the statement that caused such anger among the unemployed: it was made by the first Japanese office to offer robots on lease, offering "excellent workers capable of working round the clock and not demanding improvements in work conditions or pay raises..."

"Microelectronics and Society. For Good or Evil." This was the title of one of the latest reports presented by specialists from the not unknown "Club of Rome." In this report the authors remark somewhat sentimentally that "in essence, microprocessors can be the key to Utopia. However, as always happens in fairy tales, this road is strewn with many obstacles, some real, some imaginary, hidden in the nature of today's society." We should make this formulation more precise: "in the nature of capitalist society." For in a socialist society problems of unemployment, for example, do not exist, as they do in the very sharp contradiction with modernization in the countries of the West.

In our country the extensive automation of technological processes is acquiring important, state significance. This can be seen in particular in the recent CPSU Central Committee and USSR Council of Ministers decree "On Measures To Accelerate Scientific and Technical Progress in the National Economy."

It focuses the scientific collectives on the search for the shortest paths to further intensification of social production and improved efficiency.

In conversation with a LITERATURNAYA GAZETA correspondent, the work of Soviet scientists in this direction and the problems and prospects in the development of robot technology in our country is discussed by the chairman of the USSR Academy of Sciences scientific council on the problem "Robots and Robot Technology Systems" corresponding member of the USSR Academy of Sciences I. Makarov; chief of the USSR State Committee for Science and Technology Computer Technology and Control Systems Main Administration doctor of technical sciences V. Myasnikov; director of the USSR Academy of Sciences Institute of Problems of Information Science corresponding member of the USSR Academy of Sciences B. Naumov; department chief at the Moscow Higher Technical School imeni Bauman and chief of the USSR Academy of Sciences and USSR Ministry of Higher and Secondary Specialized Education "Robot Technology" scientific training center corresponding member of the USSR Academy of Sciences Ye. Popov; chairman of the USSR Academy of Sciences scientific council on machine theory and machine systems, director of the USSR Academy of Sciences Institute of Machine Science corresponding member of the USSR Academy of Sciences K. Frolov; and chief of the laboratory of robot technology systems at the USSR Academy of Sciences Institute of Machine Science doctor of technical sciences A. Korendyasev.

#### Now We Need Thinking Machines.

[Question] It was recalled in a recent publication that we have less than 10,000 robots here in the country. This is scarcely a large enough amount to replace live hands with mechanical hands on all sectors involving heavy labor or dangerous labor... Why is it that robot technology is not being developed and introduced very rapidly, if you will?

I. Makarov: Both here in this country and abroad robot technology has received truly broad recognition only in recent years with the appearance of microprocessors and microcomputers. These computing facilities (cheap, standardized, compact) make it possible to deal with quite complex control tasks and they also make it economically expedient to mass produce and use robot technology devices.

Robots are now confidently being assimilated in dozens of occupations and becoming commonplace in the most varied sectors of industrial production. First, to recall recent history, there was the successful use of NC machine tools, and this was followed by machining centers. Numerous published pieces on the advantages of automated control systems and automatic devices introduced in warehousing and transportation are also fresh in our minds.

Thus, step by step, a base was created for a switch to completely automated enterprises. They are called flexible, because they can be quickly reset

to switch from the production of one kind of output to another, and thus it becomes efficient and profitable to make small batches of articles and even individual articles. They are called personnel-free, because they require only a minimum number of workers. One example of this is the Japanese firm Fanuk, which I have visited. Here the entire production cycle has been automated, from warehousing of raw materials to packaging and dispatch of the finished output; during the daytime you can count on the fingers of one hand the number of people present in the plant, and at night a single, solitary operator is on duty..

Similar automatic plants are also being created here in our country (the Dnepropetrovsk Freight Car Plant and others). This is not something that will happen sometime in the distant future; it is happening today. Suffice it to say that the 11th Five-Year Plan targets envisage the development and assimilation of dozens of shops and sections equipped with industrial robots. But the flexible, automated production facilities cannot be handled by the first-generation robots with their rigid control programs that are difficult to alter. We need second- and third-generation robots--robots with the so-called sensing systems and facilities that simulate intellectual functions (planning, search, decisionmaking). And these kinds of robots are only just emerging from the research laboratories and going out into the production areas.. By the end of the present five-year plan, according to the plan there should be about 50 models of industrial robots. And their introduction in production is associated with a need for corresponding renewal of technology, interfacing all the elements of control, and training servicing personnel. For it would naive to think that, for example, a miner or a blacksmith, or a foundry worker or a fitter is qualified as soon as a robot with a microprocessor appears alongside him, just because he has mastered the "additional" occupation of programmer.

A. Korendyasev: We are behind the leading countries in the West in robotization, not in the quality of scientific developments but in terms of technical realization. The reason for this is that our institutes most often do not have their own production bases; they have to "strain" to get the equipment that they need, and sometimes simply hope that a scientific paper is noticed and that someone from among the producers will show a practical interest in the scientists' proposals... In this connection I would like to draw attention to the experience of Japanese firms, whose purview includes not only the scientific development of ideas but also their realization, right down to their introduction in the firm's plants. And each enterprise specializes in the production of the individual elements needed for a future machine, and so the question of where to get them does not arise.

Let us consider the conditions in which our laboratory of robot technology systems has been set up. The next model already exists in the designers' calculations and drawings, and now it is time to "clothe" it in metal and move over to the test-bench. And now an acute question arises: where to get the parts needed? The institute's test production facility has at its disposal an extremely limited set of essential parts. It is, of course, not a leading, strong enterprise keeping up with the scientific quest... And what if suddenly some change is needed in a design? Then it will probably be necessary to go hat in hand to the management of some major enterprise.

Usually we develop a new machine from start to finish just in the best way we can, even if this means refurbishing old, worn-out assemblies. This procedure, of course, does not promote the rapid embodiment of new ideas. And even purely scientific problems are resolved more slowly than we would like because of the poor state of up-to-date equipment in the research laboratories. Let me give you an example.

Until recently here in this country we had no series production of the so-called anthropomorphic robots (copying the movements of a person), even though good prospects exist for their introduction and they had shown themselves to be much more maneuverable than existing automatic manipulators; moreover, they occupy less space and in some sectors are simply irreplaceable. In a very short time the scientists at our institute proposed the required models and mockups, while specialists at the Scientific Research Institute of Technical Instruments (in Smolensk) in just as short a time developed the TUR-10 robot. And although this is today's best Soviet development it is still far from perfect. For example, the mechanical arm must be taught to imitate accurately the movement of the human arm, which, as is known, has 26 degrees of free movement. Up to now TUR has learned only six. Japanese scientists are also grappling with this problem, working on the "arm-trunk" project. The arm will freely make movements in various directions. We have been working on our own "arm-trunk" version for a long time already but are only now starting on the development of an actual device, because, once again, we did not have the necessary equipment.

#### A Metallic Voice Saying "Good Day."

[Question] In publications dealing with robots use is made of the concept of "artificial intelligence." What does this mean in this case?

K. Frolov: "Artificial intelligence" as applied to a robot is the greater or lesser richness of its "sensing ability." As is known, manipulators have a strength somewhat exceeding that of a man but they operate according to rigidly set programs without any of the "intelligence" that we are talking about. To develop a robot that is not only a working robot but also a "thinking" one means to give it sight (electronic eyes in the form of a television camera), hearing (a microphone) and other sense organs. The "thinking" mechanism in the modernized robots is approximately as follows: using special sensors they orient themselves in an ambient situation and build up a digital model of this situation in the "brain" of the computer, deciding what to do and in which direction to move. They can come to a halt if they encounter an obstacle in their path, or turn to other work in accordance with a changing situation.

Despite these apparently great successes, the "intelligence" of a robot is still extremely low. A machine can be programmed for specific actions in an ideal, mapped-out situation, but if there is the slightest deviation from the program it will break down. Is it possible to provide for all conceivable changes in the environment? It is, if we develop additional equipment whose cost, however, will exceed the cost of the original equipment, and then some.

Scientists are developing the so-called adaptive robots that will be able to adapt themselves to a changing situation. Moreover, these robots are learning to reproduce human speech so that they can be controlled by voice commands and even "converse" with a human being. All this work involves great technical difficulties. It was recently reported in the press that a "speech synthesizer" has been developed in Hungary, that is, an experimental installation that reproduces texts inputted to it, using different intonations, in Russian and Hungarian. But you see, for the robot to say just "Good day" 500 different characteristics had be put into its memory...

[Question] Almost every large enterprise is now developing its own robot. Is is not time to organize centralized management more decisively in the field of robot technology?

V. Myasnikov: It is true that we do not have one single center to develop and introduce robots, and in my opinion it would not be advisable to organize one. It is very difficult to satisfy the demands of all sectors of the national economy, taking into account each one's specific nature and combining different interests and requirements. Accordingly, head scientific research institutes have been created and are working to develop different kinds of new equipment, while the sector ministries are engaged in introducing them in production.

With regard to combining the efforts of science, this is taking place within the framework of the comprehensive, goal-oriented programs on robot technology drawn up by the State Committee for Science and Technology, the Academy of Sciences and the USSR ministries. The program of the State Committee for Science and Technology provides for research of an applied nature, test and design work and series production of automatic manipulators. Already by 1985 implementation of the planned complex of measures will make it possible to produce about 30,000 manipulators whose introduction will enable more than 70,000 workers engaged in heavy manual labor to be released for other work. Some 22 ministries and hundreds of organizations and enterprises have been recruited to fulfill this program.

[Question] We have repeatedly heard that the cost of new equipment is not being recouped. Is this so? Could you deal with the economic effectiveness of using robots in production?

Ye. Popov: If you put this question simply it becomes: is it or is it not profitable? And often it is not possible to give an unambiguous answer.

New equipment is always expensive. This is no secret. And expenditures are required not only for installing and setting up the machines, but also for training workers and improving the skills of specialists. In turn, this entails wage increases... Is this too expensive for the enterprise? No. The expenditures are justified! Not immediately, it is true. Later, when significant labor productivity growth and improvements in product quality have been achieved and equipment is being used at full capacity. And this is not achieved by the introduction of individual robots. Economic analysis shows that the maximum effect per ruble of expenditure is provided by comprehensive automation of production, complete from the reception of raw materials to dispatch of the finished product.

Nor should savings on cultural and everyday and housing construction and services, and training and so forth be forgotten. For a robot has no need of an apartment, dining hall or bus in order to do its work... If we take these social factors into consideration, then according to the expert testimony, robot technology is recouped 10 times faster than what is regarded as the norm, using existing calculation methods. New methods are now being worked out and applied on an experimental basis at a number of enterprises. When standard state normativs have been worked out the answer to the question of whether or not it is profitable will not be so acute.

A. Korendyasev: Robots and automatic devices are designed primarily to relieve people of heavy, unskilled labor. And herein lies a paradox: sometimes the workers fail to perceive the new equipment as something that facilitates and helps them. Things have got to the point where at some enterprises robotization has been met with fierce resistance. It became clear, for example, that robots were taking over from the forging operators who were then being transferred to... even heavier work. And the opposite has also happened: workers are offered easier work but are dissatisfied because of the drop in wages.

In short, the enterprise administration should carefully study the placement of personnel, weighing the losses and gains for each person, sometimes reaching a compromise by paying a worker his former wage merely for watching a robot. Is this unprofitable? Yes it is, until more substantive and reliable "arguments" are produced for comprehensive automation of a production facility.

#### How To Avoid Conflicts with Technology.

[Question] The newspapers have repeatedly told about cases occurring, for example, in America, when large computer systems broke down and the serious consequences that this entailed in the lives of thousands of people. The thought occurs to one willy-nilly that such systems are objects of increased danger. How does this square with the growing trend to automate everything? Perhaps the science-fiction writers are correct when they tell of future conflicts between man and machine?

K. Frolov: Safety is reliability. Whereas now a good worker as it were feels the lathe and can eliminate in advance the slightest trouble, what will happen when the machine is operating in automatic mode? How to eliminate the possibility of equipment breakage when there are nothing but robots all around? Of course, there will necessarily be a setter-up; we should not really talk about shops or plants with no people at all. There will still be a need for special diagnostic systems capable of "seeing" a defect and "reporting" it to the setter-up. This is a difficult but soluble task when we consider that the scientists are already thinking about developing self-regulating, self-repairing and self-reproducing robots...

Ye. Popov: The concept of "conflict" is considered most usually on the psychological plane, and as such is possible only between thinking beings. But a robot is a machine, even if it has intelligence and is sometimes capable of completely replacing human beings in certain fields of its activity; it

is still a machine! I think, therefore, that the process of "lack of mutual understanding" should more properly be called "machine mutiny." We specialists use this term in those cases where a series of devices malfunction and require much effort and time and put right. This kind of "conflict" is possible, and we are able to deal with it.

B. Naumov: I think that the basis for "lack of conflict" is the ability to do what is needed with the equipment. This must be learned and taught. When robot technology has infiltrated extensively into our everyday existence it is we ourselves who will determine how it is to be set up. If the skills of dealing with robots using the language used to "deal" with computers are learned in school then any kind of conflict will be eradicated.

A. Korendyasev: There is yet another nuance in the meaning of conflict: people somehow fear that machines will be smarter than they are and they are reluctant to give up the chance of doing interesting, creative work. This psychological difficulty will be overcome when people understand the principles and operating mechanism of the machines and their actual possibilities. For then it will become clear that there is nothing supernatural in the actions of robots except for the programs fed into them by a man.

At the same time there are some things that a man cannot do. Take, for example, microelectronic welding. A robot can do this better than a man and free him from stressful, fatiguing work. But how can conflict arise from this?

[Question] Robot technology is infiltrating ever more deeply into our everyday existence. People talk about "domestic" robots. Will not man become too dependent on machines? Will this not lead to a sense of his own helplessness in his desire to put all his difficulties on the "shoulders" of his iron doubles?

K. Frolov: Yes, it can be shown that complete automation is a bane for people accustomed to physical labor. To be sure, will it not lead us to freedom from "extraneous" movement and to a unique kind of "epidemic" of hypodynamia?

The process of robotization should not be evaluated from these kinds of positions. Doubts and misgivings ineluctably accompany any innovation, but it is impossible to ignore the positive aspects of this same robot technology. In the long term it will, for example, make it possible almost completely to automate the services sphere (and it is probably not worth yet again recalling all our difficulties associated with the imperfections of this sphere). Why "almost"? Because there will still be the setters-up who duties will include the repair of domestic machines as part of our present instrumentation.

We still cannot say that everything is going fine, that there will be no problems. There will be problems, there always are. But problems must be solved not run away from. For example, the problem of a spread of hypodynamia must be studied and resolved by the physicians and sociologists. However, it should be said in advance that it is being exaggerated: the process of freeing people from heavy, boring work is not the same as complete inaction.

No matter how much of production is automated, people will still have much work, including physical work, that will have to be considered and combined harmoniously with mental, creative labor.

[Question] Where and how is specialist training for robot technology being carried out? Is this specialty being taught in the VUZ's?

Ye. Popov: The specialty "Robot Technology Systems" was introduced for the first time at the Moscow Higher Technical School imeni Bauman. Our example has now been followed by 10 technical VUZ's in the country. Each department has its own special training plans confirmed by the USSR Ministry of Higher and Secondary Specialized Education. Studies are based mainly on experience in individual developments. At our school, courses are also conducted to improve the skills of teaching personnel. Since 1975 a faculty for training engineers from industrial enterprises has been operating at the Moscow Higher Technical School. In addition, an Academy of Sciences and USSR Ministry of Higher and Secondary Specialized Education scientific training center has been set up for problems in robot technology. It exercises scientific and methodological leadership over personnel training and it retrains production engineers.

B. Naumov: The problems in specialist training are now extraordinarily urgent. They face both us, the developers of the new equipment, and those who will use it. And at all levels, from accompanying documentation to textbooks for the VUZ's. Consider this. Previously, when improved and expensive machines were being produced by the dozen, it was possible to send a "mentor" with each one of them who would teach servicing personnel. But when they are being produced by the thousand, what then? One American has devised a unique test for minimizing teaching; after having familiarized himself with this for 10 minutes a person is ready to start work with an unfamiliar installation. In order to master a different one of our computers it is necessary to read many hundreds of pages of descriptions, rules, directions... The mass introduction of computers and robots demands a simplification of the process of mastering the new equipment. For this it is necessary to compile both concise training aids and manuals that will contain a minimum of essential information, and also special teaching programs that will make it possible for people using the new equipment in their work to obtain this information. Students also require these facilities--those future engineers, technologists and captains of production. In this world of modern technology it is even time for schoolchildren to get to know about the latest achievements of science.

We will undoubtedly live to see the day when at most enterprises there will be not dozens or hundreds, but, I think, even thousands of robots and automatic manipulators. And if we talk about their mass introduction then the corresponding knowledge must also be acquired on a mass scale. In the long term it is possible that this "second literacy" will become universal, just as today it is usual to be able to read and write.

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## SOCIAL PROBLEMS OF MECHANIZATION ANALYZED

Tallinn SOVETSKAYA ESTONIYA in Russian 7 Apr 84 p 2

[Article by V. Konstantinov, chairman of ESSR Goskomtruda [State Committee for Labor]: "Effectively Means Productively: Manual Labor for Machines (Notes on the Social Aspects of Mechanization and Automation of Production)"]

[Text] Once one of the leaders in the sector asked me: "Isn't there a lot of noise being raised now over a reduction in manual labor? If you look at this matter from an economic standpoint a reduction in manual labor is in fact not always advantageous to the enterprise or ministry."

As a matter of fact, in a number of instances the creation of new work places costs less than the renovation of existing work places where manual labor prevails. Discussion of how to compare these costs will abate, but now let's have a look at the problem of the need for reducing manual labor from not only an economic standpoint, but a social standpoint as well. We'll look at it, let's assume, through the eyes of women, who comprise more than half of all persons employed in the republic's national economy and, alas, also more than half of those engaged in manual labor.

Such an apology for "leading" positions lies as an additional burden on the shoulders of a woman who is overburdened without that. As a rule a mother who has worked a shift in production together with her husband stands a second "watch," this time in her kitchen, preparing supper for the family, and she almost constantly stands yet another "watch" in caring for the children (and she cannot forget her husband!). And so we have not a load, but an overload. It is the primary concern of a manager of any rank to remove a portion of the load and of the heavy, unskilled manual labor. It is a very acute social problem which has a close bearing on the negative demographic situation existing in the republic. It is such that the natural increase in the republic's population of ablebodied age has been negative beginning with 1981 and, according to data of the latest population census, the family averages 3.1 persons.

The existing situation can be altered only through comprehensive mechanization of manual labor, and above all where a majority of workers are women. This is the first conclusion, but it is not the only one and far from an exhaustive one. Why?

Now let's have a look at this same question through the eyes of today's young people. The low level of full mechanization and a slow reduction in unproductive, unattractive and heavy physical labor in a large number of productions generates a need for an unskilled and physically strong work force, i.e., the youth.

Also drawing attention is the negative circumstance that in a group of young people up to 30 years of age employed in the national economy today, 27 percent (or 49,000 persons) still do not have a secondary education. This is one aspect of the matter. On the other hand, in recent years thousands of graduates of secondary schools of general education are going into production work without professional training and so they often are placed in heavy, unattractive, unskilled or monotonous work. Hence the dissatisfaction with labor and at times a dislike for production and for physical labor which arises earlier, even from the schoolbench. This already is a major social problem, a problem of indoctrinating a respectful attitude toward physical labor.

Of course this problem did not arise all at once. Let's recall the 1960's when it was reiterated to young people from all sides that everything unattractive in labor will disappear very quickly, and they even gave a date--1980--for total elimination of manual labor and the onset of an era of computers, manipulators, robots, intelligent humanlike mechanics and so on. This also had a certain negative effect on young people's attitude toward physical labor.

The second conclusion is the social significance of the problem of reducing manual labor and replacing it with full mechanization from the standpoint of satisfying young people's needs.

And the third conclusion, a way out of the unfavorable situation with labor resources, is the actual freeing of skilled workers from manual labor. This is a reliable source for augmenting labor resources, and this also has to include young people who obtain working professions within the walls of schools of general education or PTU's [vocational-technical schools].

The requirement of public production will continue to grow naturally, and these tasks have to be performed with a lesser number of people. There is one solution to the situation: shift manual labor to the shoulders of machines. And today we don't need "fragmentary," partial mechanization which not only does not solve social problems, but also doesn't bring economic advantage, becomes unprofitable (as mentioned at the beginning of this article), and undermines people's faith in the advisability of using new technology.

Without a doubt, every head of an enterprise or organization has an excellent understanding of the social significance of the problem of labor by mothers and young people, and the need to create normal working conditions for them in production. He also understands that mechanization increases the return of labor many times and frees people needed for fulfilling state plans, the intensity of which continues to rise.

But emotions alone clearly are insufficient even for a progressive head of a sector or plant. He has to know how much and of what resources is required for solving the problem of full mechanization of jobs employing mothers or young workers. A complete accounting and certification of work places will provide an answer to this question. This work is within the ability of plant specialists and technical-economic services. After analytically summing up the results of a certification one can establish the sums of inputs for capital investments, for equipment, the labor force and so on with a certain degree of validity.

With these initial data the manager will obtain (for the first time!) an opportunity to control the problem of reducing manual labor by combining advantages of an economic and social nature and he will be able to orient himself more easily in accomplishing current and future tasks of full mechanization. The party's demand that any matter rest on reality and, in working out major problems, on the future, thus will be correctly considered and the principle of scientific foresight in combination with suggestions of workers and engineering-technical personnel would be observed.

This is the approach which must be assured in developing a specific comprehensive program for reducing manual labor (TsKPRT) to the year 2000 and subdivided by five-year periods.

There is no question that even after obtaining results of a complete certification of work places and a registration of manual labor, but not having determined the priority and sequence of mechanization tasks vertically (from the director to the minister), you will seriously complicate the program's compilation. For example, having set the task of eliminating the manual labor of mothers before 1990 (by the way, this concept is being advanced as realistic by scientists and specialists of the USSR AN [Academy of Sciences] and USSR GNTK [State Committee for Science and Technology]), you will receive requirements alone by kinds of resources.

If priority is given to the elimination of manual, heavy physical labor or to full mechanization of secondary jobs you naturally will receive different initial data of the requirement by kinds of resources. In any case several versions will appear, but there is an opportunity to realistically weigh what resources the plant itself can provide and what has to be requested in the ministry and in planning agencies. With this approach, resolution of the matter of resource allocation in higher agencies depends least of all on the "talent" of the plant manager or his ability to convince, persuade or solicit. An objectively conducted certification and registration sweep aside the need for a director or chief engineer to have such kind of "talent."

The urgency of the task of reducing manual labor was emphasized at the June 1983 CPSU CC Plenum. The scale of application of manual labor and the rates of its reduction generate concern.

For example, while a turning point was apparent in Estonia's industry (over a three year period the annual rates of reduction of manual labor were

2.1 points as against 1.5 points for the same period of the last five-year plan), these rates are dropping in construction. It is the very same situation in agriculture and in transport.

Problems of mechanizing ancillary production are being solved unsatisfactorily. The mechanization level here compared with primary production is two times or more lower although the scientists say that the effectiveness of measures here is 2.8-3.5 times higher.

The state of affairs with mechanization in loading and unloading operations, in warehousing services, and in transport generates special concern. Today the party is setting the task of overcoming inertia and providing a cardinal turn in solving this neglected problem. To this end it is important to tie together the individual measures being implemented.

At the present time an interdepartmental commission is operating under USSR Gosplan which is developing the TsKPRT for the period up to the year 2000. Similar programs must be developed by all ministries and union republics. In the ESSR this work is assigned to Gosplan, Goskomtrud [State Committee for Labor] and Gosstroy [State Committee for Construction Affairs] of the republic with the participation of Sovprof [Trade Unions Council], Agroprom [Agroindustrial Association], ministries and departments. By decision of four agencies (the republic Gosplan, Gosstroy and Goskomtrud and Sovprof), the ESSR Goskomtrud, the head organization, is the coordinator for developing TsKPRT-2000.

It is of course no simple matter for economic managers and technical services of industrial enterprises to draw up the TsKPRT for a five-year period and further up to the year 2000 but, on the other hand, there already is experience in drawing up such a program for the 11th Five-Year Plan. In addition, ESSR Goskomtrud is ready to provide any methods or other assistance; our committee is responsible for methods support and coordination of all work on developing the program. The committee has highly qualified specialists who are capable of helping and, if necessary, performing an appraisal. Before the republic program is compiled sector programs must be drawn up, registration performed and a list of professions determined which are subject to priority mechanization.

Program development is broken into two phases.

In the first phase a preliminary draft program must be compiled without an assignment from above on the basis of scientific forecasts, the development program of scientific-technical progress, and arrangements for development of productive forces of sectors, the republic, and the given enterprises.

Without a doubt, a review of the accounting, certification and rationalization of working places and above all the elimination of unproductive, ineffective work places based on the experience of the Dnepropetrovsk Combine Plant imeni K. Ye. Voroshilov will have a positive influence on the conduct of this work. This review has been prepared and announced by a joint resolution of the ESSR Goskomtrud, Sovprof, VOIR [All-Union Society of Inventors and Innovators] and

NTO [scientific-technical society]. The purpose of the review is to activate the work and include in it the foremen, masters, and public organizations of labor collectives.

In the second phase there is a refinement of the scale of application of manual labor and the program's system of measures determined in the first phase, based on centrally established quotas to reduce the application of manual labor and allocated resources. The program's system of measures is tied in with drafts of the plan for the 12th Five-Year Plan, and above all the plan for enterprise renovation and retooling as well as basic directions for the period up to the year 2000.

The most important task in preparing the program is to resolve the labor problem through a system of mutually connected, constantly effective planning indicators at all levels including USSR Gosplan.

This is no simple matter, but it is extremely necessary.

6904  
CSO: 1814/146

#### PRAVDA CALLS FOR SCI-TECH 'ACCELERATION FUNDS'

PM241952 [Editorial Report] Moscow PRAVDA in Russian 20 April 1984 first edition publishes on page 2 a 2,250-word article written by PRAVDA special correspondent A. Nikitin reporting from Zaporozhye and Moscow under the headline "Plans with Omission Marks" and the subhead "The Economy: Large-Scale Experiment." It describes the problems of Director Akhrameyev of the Yuzhdizelmash Plant in Zaporozhye Oblast in trying to get backing for the production of a new diesel motor. The article traces his fruitless visits to all possible relevant bodies, which all approve and even laud his project in theory but decline to provide any real assistance or financial backing. This is an anomaly, Nikitin observes, since economic experiment is the call of the day but nobody will accept specific responsibility for it.

"There is a lack of coordination between the principles of planning and incentives. Whereas the basis of the former is intersectoral in nature, the practice of incentives is locked within the shell of a particular sector. At every step we fight for national economic and results, but there have never been and still are no intersectoral or joint systems of incentives. The large-scale experiment aimed at expanding the rights and increasing the responsibility of labor collectives has not broached these questions either. But they must be asked and resolved. How?

"Primarily, probably, economic integration among enterprises of different sectors must be stepped up. For example, as well as individual funds, unified intersectoral funds for providing material incentives to collectives and developing related production facilities must be created. These, like credits and shares too, can become the financial basis for the advancement of innovations in which a definite circle of manufacturers and consumers are interested. Part of the profits from the use of the new equipment in the national economy would replenish these 'acceleration funds' until the innovation ceased to be new and brought perceptible returns.

"This would help departmental barriers to be replaced by departmental contacts. And then the current dependents among consumers would probably obtain more rapidly both the new diesel motor and additional profits with it.

"We must not permit the influence of the center to be weakened as the organizer of the country's economic life. But neither must we permit the springs of initiative and economic enterprise welling up from below to be curbed."

When these omissions in planning have been rectified, Nikitin concludes, the way forward for directors like Akhrameyev will be clear.

## WORK OF URALS SCIENTIFIC CENTER DESCRIBED

Moscow IZVESTIYA in Russian 18 Feb 84 p 2

[Article by Hero of the Soviet Union, Academician S. Vonsovskiy, chairman of the Presidium of the Urals Scientific Center of the USSR Academy of Sciences, Sverdlovsk: "How to Test an Idea"]

[Text] In his speech at the special plenum of the CPSU Central Committee Comrade K.U. Chernenko stressed the fact that the party has clearly defined the main directions for the development of our economy. "Intensification, the accelerated application of scientific and technological achievements in production and the implementation of large, comprehensive programs--all of this," Konstantin Ustinovich said, "should ultimately raise our society's productive forces to a qualitatively new level."

To improve the efficiency of academic science and its applied results, to concentrate our efforts to an even greater degree on the main directions outlined for the five-year period--these are the main tasks on which the Ural scientists are working today. These tasks were set forth in the decree passed by the CPSU Central Committee on the work of the Urals Scientific Center of the USSR Academy of Sciences.

The CPSU Central Committee's decree has been extensively discussed at all levels at the center and has become a real working, program document, and we plan to use it in the future and are using it even now as the guide for organizing our daily work. As the geologists say, we must "dig deeper and further" also in science.

This is especially apparent in the sciences dealing with soil. In fact, the proved raw mineral reserves at the "surface" in the Middle and Southern Urals have been exhausted to a significant degree. We are therefore faced with the task of seeking ores at deeper levels, as well as in the Northern and Polar Urals and in adjacent areas. The Center's geologists and geochemists, in collaboration with workers of the branch, have already obtained encouraging results in the discovery of new deposits of commercial minerals. The geophysicists have developed and are successfully applying unique equipment based on nuclear physics, which is outstripping the achievements of our foreign colleagues and is significantly enhancing the effectiveness of geological exploration.

There is still no room for self-delusions, however. The results of these projects could be incomparably greater if the UNTs [Urals Scientific Center] had its own production and design base. In order to reduce the amount of time required for the studies and to accelerate the application of their results, we have begun setting up temporary scientific production subdivisions, in which the efforts of academic and branch institutes, VUZ's and industrial associations of the Urals and other regions of the nation are united. Geologists, geochemists and geophysicists, together with scientists in the related sciences, will perform global projects in the study of the dynamics of geological structures and make comprehensive studies of iron, copper, chromite and other deposits. We are on the threshold of the 3rd millennium, and this is not just a round-number date in our system of chronology. It is a juncture of different eras in scientific and technological progress.

A report presented by the Urals Scientific Center on the development of production forces in the Urals Economic Region for the period extending to 1990-2000 was discussed in 1980 in the Collegium of the USSR Gosplan. It was noted that the conclusions of Ural scientists are helping to eliminate disproportions in the economy of a large and important region of the nation and contributing to the improvement of the workers' standard of living. The USSR Gosplan assigned the UNTs the task of taking charge of the development of a program of intensification for leading economic branches of the Urals as an integral part of the plan for social and economic development for the 12th five-year period. A total of 33 ministries and departments, more than 150 scientific research institutes, planning organizations, VUZ's, production associations and enterprises, and Academy institutes were drawn upon for its development.

In accordance with the decree passed by the CPSU Central Committee, however, we must now resolutely focus the efforts of the scientists on an even more thorough study of the most important social and economic problems. It will provide the foundation for a comprehensive program of scientific and technological progress in the Urals to the year 2005. Science must provide a clear picture of the historical perspective and correctly define the directions of progress.

It should be stated that we have achieved certain successes during recent five-year periods. Let the figures speak for themselves. The effect from the application of projects carried out by the Ural scientists was 44 million rubles during the 9th five-year period. It exceeded 275 million rubles during the 10th, and is approaching this figure for the first less than 3 years of the current five-year period. A favorable growth trend is in evidence. Are we making full use of all our potentials, however? We must activate all channels for putting the achievements of scientific thought into effect. The work of the self-supporting Magnetic Flaw-Detection Laboratory of the Metal Physics Institute has produced good results in this area, especially in the development of magnetic devices for monitoring the quality of pipe welding. This is one of nine laboratories in the entire USSR Academy of Sciences with the work organized in this manner. This successful experiment absolutely must be continued and expanded. There are still other ways of materializing scientific thought.

Metallurgists of the UNTs have productive ties with the Rezh Nickel Plant, for example, where a laboratory with dual affiliation has been set up and is successfully functioning. The electrochemists of the Urals Scientific Center are

actively collaborating with an experimental plant of the Unipromed' Scientific Research Institute of the USSR Ministry of Nonferrous Metallurgy. The Presidium of the UNTs and the Council of Directors of Sverdlovsk Plants have made a detailed study of the situation of the scientific center's experimental bases at enterprises, the establishment of which is referred to in the decree of the CPSU Central Committee. We receive perfectly specific proposals for joint work from VUZ's, branch scientific research institutes and many industrial associations in the region. They are carefully reviewed and are already being implemented.

Agreements on cooperation between industry and science are producing the effect, of course, and will continue to do so. This is not a panacea for all problems, however. The linkage between science and the practical work certainly does not rule out the establishment of our own experimental production base, a reliable testing ground for the initial "breaking-in" of our ideas. The "love" of the enterprises for science is, after all, not a platonic thing. They conclude agreements only if a specific end result is apparent--a material, an instrument, a device, a machine or a technological process.

Here also I can cite numerous examples of how the absence of our own experimental base is hampering scientific progress. The Electrochemistry Institute of the UNTs, for example, developed a boronizing technology which promised a realistic effect of many millions even at the threshold of its application. Boronizing the surface makes non-corrosion-resistant metal items essentially everlasting, makes them as durable as items manufactured of expensive and, most importantly, scarce, high-alloys. The new technology has traveled an extremely thorny path to practical application, however. Only one electrolytic cell was set up in a meager institute area, while the plants looked askance at this sort of "homoeopathy" and were in no hurry to adopt the technology. Institute workers sometimes traveled to these "doubting Thomases" with that same, single cell. Had we had our own experimental base, this valuable technology would have produced a good return more rapidly.

Another example. At the suggestion of Academician A. Aleksandrov, president of the USSR Academy of Sciences, corresponding member of the USSR Academy of Sciences Ya. Shur and his colleagues developed a magnetic system, greatly needed in the textile industry, which prevents losses of raw material when the thread breaks in a spinning frame and greatly simplifies the difficult work of the spinners. Experimental units underwent laboratory tests. No one in the nation would agree to manufacture these systems, however. Our scientists took on the job themselves and produced around 40,000, no more and no less, of these devices needed by production. This could be depicted as a feat by the scientists, who can see further than certain production workers with their narrowly departmental outlook, of course. But is it not wasteful, even for the triumph of an idea which produced a large saving for the nation (and a no-less important social effect--making the people's work easier), however, for prominent scientists to spend their time on work which is so unproductive for their profession? And what if they had abandoned their idea before it was realized? They could have done so, after all....

We could go on listing these thorns so grievous to science. This is why we all accepted decisions to build experimental bases for the UNTs at Sverdlovsk, Izhevsk and Perm with enormous enthusiasm, and this is no exaggeration. The clearly stated lines pertaining to this in the decree give us confidence that there will be a base for experimentation.

We should not believe that everything is now fine, however, and that our future path will be a smooth one. The construction situation is very poor. We ourselves are doing poorly in the area of construction--our construction and installation administration fails to make up the lag year after year. And the situation of our subcontractors from the USSR Ministry of Heavy and Transport Machine Building is no better. A new building has been "under construction" for the Metallurgy Institute in Sverdlovsk for 8 years now. I would point out that this construction project would amaze no one with its cost or the size of the facilities. It is an ordinary building with a total construction and installation cost of 2 million rubles.

Leaders of the Glavsreduralstroy Trust of the USSR Ministry of Heavy and Transport Machine Building assured us at a meeting of our center's party and management aktiv that from now on the trust will include projects for the Academy of Sciences in the list of priority projects.

Ural science has broad horizons, and it is difficult even to predict the scope of its benefit at the practical level, but the benefit can clearly be enormous. We are beginning the development of general plans for the construction of complexes for our installations in Perm and Izhevsk. Construction of the scientific center at Sverdlovsk, which has been selected as the base for the UNTs, is to continue. We also attach importance to the transpolar construction of a scientific base at the settlement of Labytnangi in Tyumen Oblast. Russia's northern regions must play a more important part in the nation's economy.

All of us in the Urals regard the decree passed by the CPSU Central Committee, "On the Work of the Urals Scientific Center of the USSR Academy of Sciences," as yet another manifestation of the constant concern and attention given by the party and the government to the development of science in our socialist homeland. Great concern is demonstrated, but we must give a corresponding return for that concern.

11499  
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MALFEASANCE, FAILINGS AT OCEANOLOGY INSTITUTE NOTED

Moscow SOVETSKAYA ROSSIYA in Russian 8 Feb 84 p 3

[Article: "Will the Situation Change?--A Principled Discussion in the Party Raykom Buro on the Situation at the Oceanology Institute"]

[Text] The Sevastopolskiy Rayon Committee of the CPSU in the city of Moscow has reviewed the work of the party buro and management at the Oceanology Institute imeni P.P. Shirshov of the USSR Academy of Sciences in the selection, placement and indoctrination of personnel and the enhancement of their responsibility for the assigned job. The earnest and principled discussion covered a large group of issues, including problems raised in the articles "The Situation" and "A Strange Invulnerability," published in the newspaper SOVETSKAYA ROSSIYA on 10 November and 16 December of 1983.

Comrade Monin and Comrade Byshev, communists, committed a number of acts without legal basis. An investigation conducted by the Finance Administration of the Mosgorispolkom [Moscow City Executive Committee] turned up violations of current laws.

Instances of use of service position for personal objectives and violations of the standards of party ethics were uncovered. Individuals were appointed to a number of leading positions without considering their qualifications, as were close relatives of institute leaders.

It was noted that financial infractions at the institute's Leningrad Branch were not seriously discussed in the party organization.

The investigation conducted by the Sevastopolskiy Rayon Section for Campaign Against Embezzlement of Socialist Property turned up misconduct on the part of the institute director in the repair of his personal dacha.

Comrade A.S. Monin, director of the Oceanology Institute imeni P.P. Shirshov of the USSR Academy of Sciences, was issued a reprimand, which was entered in his records, for serious deficiencies and failings in the selection, placement and indoctrination of personnel, use of his service position for personal objectives, and violation of the standards of party ethics.

Comrade V.I. Byshev was issued a reprimand and was relieved of his duties as secretary of the party bureau for directing the party organization unsatisfactorily and for failure to take steps to improve the moral and psychological climate in the collective.

The Bureau of the Sevastopolskiy Rayon Committee of the CPSU has ordered the Oceanology Institute's party organization to discuss this resolution and to work out and implement measures to eliminate the existing shortcomings and take steps to improve the moral and psychological climate in the collective within a period of 1 month.

11499  
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## WAYS TO IMPROVED SCIENTIFIC RESEARCH WORK OUTLINED

Moscow LENINSKOYE ZNAMYA in Russian 11 Feb 84 p 3

[Article by Hero of Socialist Labor S. Papkov, professor, doctor of chemical sciences, department head with the Khimvolokno Scientific Production Association: "The Objective--a High Level of Effectiveness"]

[Text] Decisions coming out of recent plenums of the CPSU Central Committee require all of us to take an especially careful look at our work and its organization and at possible reserves for enhancing effectiveness.

There is no question that the scientific workers do have reserves. I would first like to say something about the underlying factors creating the foundation for effective work by the scientists, however.

I would cite just two examples typical of many scientific organizations. The system for ordering chemical reagents is not very well conceived. Even minor needs have to be foreseen a year in advance. If the studies then take a different turn, the need for the planned reagent is eliminated, the supply of reagent has to be liquidated, and a new item extremely necessary for the operation cannot be obtained through normal channels.

The effectiveness of scientific work is influenced even more seriously by the situation with respect to the production and supply of scientific research equipment, which frequently does not measure up to modern requirements.

With all the importance of supply problems, however, the problem of proper scientific and national economic justification of a project and its ultimate goal is still the most important one in the organization of effective labor.

The first such factor is a precisely organized scientific research task. In this case the work is interesting for any worker, and there is no great need for administrative measures to see that elementary discipline is observed.

What is our Khimvolokno Scientific Production Association presently encountering in the development of long-range plans--for the 20- to 25-year period, let us say?

The bulk of the chemical fibers produced by industry go for textile processing into fabrics. There is far from always a well-based determination of how much

fiber and what kind is needed to provide the population with clothing and other woven products, however. With respect to overall production volume, the nation's needs are growing sharply and it is doubtful that we need to fear overproducing. If we assess the situation not on the basis of gross output but according to the specific proportions of individual types of fibers, however, the optimal combination has still not been found by far. Its development is not a matter for the textile industry alone. It also involves us, the suppliers of the fibers, and must be set up on a serious scientific foundation, with the participation of scientists who know about fibers and textile processing and who study the utilization of textile materials, as well as the scientists/economists. There is no such comprehensive, scientific foundation at the present time, and planning is therefore sometimes performed as a random game of numbers.

Deficiencies in planning sometimes result in a situation in which the development of a new type of fiber proves to be poorly justified, reducing interest in the work on the part of the scientist and causing the association to make unproductive outlays. This was the situation with respect to the (polinoznoye) fiber. A great deal of time and funds were used to develop it, although there was no special need for it.

The development of fibers with new and original features is an attractive task for the researcher. Sometimes, however, too much time passes between the laboratory production and practical, large-scale realization. This not only lowers the effectiveness of the scientific work, but also disorganizes the researcher. Incidentally, for some reason it is considered to be a good thing for the scientist to personally push a project through to its application, to make the rounds of the different departments and handle the coordination paperwork, instead of spending his time on new scientific projects. The scientists' relationship with production should not involve doing the work of the production workers. There is an important reserve for enhancing the effectiveness of their work precisely in the elimination of these unnecessary outlays of time and effort by the scientific workers.

I should mention the fact that when the Khimvolokno Scientific Production Association was established, small enterprises were turned over to it for purposes of reorganizing them for semi-industrial production. Their reconstruction is proceeding very slowly, however, and only by means of the limited capabilities of the institute--the head organization of our association. Incidentally, when a scientific production association is set up, a unified system of financing for scientific and design work and for the operations of the plants should also be put into effect. We presently receive funds from three different sources, which destroys the linkage among the three links in the single chain.

Considerable possibilities for enhancing the effectiveness of development projects and stimulating scientific and technological progress also lie in the judicious use of the large engineering and technical staff at the industrial enterprises. We frequently speak of the relative low wage level for the engineer in production. But he is also not assigned the role he deserves in production. A real engineer is not an administrator or a clerk in greatly enlarged auxiliary services, but a specialist who constantly perfects the technology and the equipment and the organization of labor on the shop and plant scale. He is the agent of everything new developed at the institutes, at related and identical enterprises and in the scientific and technical literature. We need to return to the

production engineer his real purpose, which stems from the Latin root of this word--natural ability, inventiveness. We also need to make more extensive use of the basic research elements at the enterprises--experimental shops and plants, and test laboratories.

Incidentally, a trend has recently appeared in the work of certain Academy institutes and departments of higher educational institutions to make a sham demonstration of ties with industry. This consists in working up special projects which must be carried out by the branch institutes or even by the basic research elements at the enterprises themselves. This does not mean, of course, that there should be no mutual pervasion at the three levels in the organization of scientific and technological progress: the Academy institute, the applied institute and the industrial enterprise's engineering personnel. The enterprise engineer can execute a development project at the level of the applied institute, and the applied institute's worker can perform fundamental theoretical work at the level of the special academic institution. And conversely, the academic institute can develop specific technology or equipment on the basis of its fundamental research. Nonetheless, while it is good for the engineer to strive to perform his work at the scientific level of the applied institute and for the worker at the applied institute to achieve results of fundamental importance, the academic institutes and the special-problem laboratories of the scientific institutions should not forget their responsibility for the fundamental work which determines the future, large-scale perspective, substituting this work for outwardly effective projects of a thoroughly applied, small-scale nature.

The source of large reserves for enhancing the effectiveness of the work lies precisely in the proper understanding of the duties at each level of the organization of scientific and technical progress. Discipline in the broad sense of the word should also be included in this.

Recent decisions by the party have evoked in the scientists, as they have in all the nation's workers, a fervent desire to take an active part in the process of further perfecting socialist management. This accounts for attempts being made to analyze the state of the work and to find yet unrealized possibilities, both in one's own section and on a larger scale.

11499

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KIRGHIZ PARTY PLENUM EXAMINES TASKS FOR INTENSIVE ECONOMIC DEVELOPMENT

Fruze SOVETSKAYA KIRGIZIYA in Russian 19 Apr 84 p 1

[Editorial: "The Dictates of the Times are for Technical Progress"]

[Text] The party has determined that the most important economic and political task of the present stage of developed socialism is the final switch of the economy onto the rails of intensification, which is the principal condition for the economic development of the country. Achieving this goal is organically linked with accelerating scientific and technical progress. "Intensification, accelerating the introduction of the achievements of science and technology to production, and implementing the large, integrated programs--" stressed CPSU Central Committee General Secretary Comrade K.U. Chernenko at the February (1984) CPSU Central Committee Plenum, "All of this in the final analysis must raise the productive forces of our society to a qualitatively new level."

The tasks of the republic party organization for accelerating scientific and technical progress, and introducing the achievements of science, technology and progressive experience to production were examined at the recently-convened plenum of the Kirgiz Communist Party [CPKi] Central Committee. Delivering a report to the plenum was Comrade T.U. Usualiyev, first secretary of the CPKi Central Committee.

The participants at the plenum took note of the fact that the republic has established a sufficiently powerful manufacturing and scientific-technical potential, and the scientists and the manufacturers have gained experience in cooperation. Through their combined efforts, cardinal problems are being solved, to ensure scientific and technical progress in the leading branches of the national economy--machine building, power engineering, the mining industry, and non-ferrous metallurgy; in construction of hydroelectric and irrigation projects; and in agriculture. The Kirgiz SSR Academy of Sciences is taking part in developing 25 scientific and technical programs of union, regional and republic significance. These include the overall utilization of the physical, raw-material, land, water and electrical power resources of Issyk-Kul Oblast and the Chuyskaya Valley; intensification of production of sheep and their byproducts, and others. Creative ties are being expanded between the academy's institutes and production. As the result of completed projects, in the last three years nearly 300 suggestions have been introduced to the national economy, with an economic effect of nearly 50 million rubles. The role of science in the VUZ's is increasing, and the volume of research projects carried out under economic contracts is growing.

Thanks to the introduction of the achievements of science and technology and progressive experience to production, the republic's national economic complex, and above all the branches of industry which determine technical progress, are being developed at dynamic and stable rates. Fixed assets are being renovated, reconstruction and technical reequipment of enterprises are being carried out, and the level of mechanization and automatation of the production processes is being increased. In the republic's industry today, more than 2,500 mechanized flow lines and automated lines are in operation, as well as more than 16,000 units of automatic and semiautomatic equipment, including equipment with programed control. Overall mechanization and automation has been introduced in 767 sections and shops. In the three years of the five-year plan, all of this has helped to produce above-plan production worth 208,000,000 rubles, and to increase production volume by 13 per cent as compared to the 10 per cent assigned in the five-year plan. At the same time growth of labor productivity amounted to 9.4 per cent, against assigned productivity of 7.9 per cent, by virtue of which more than three-quarters of the growth in industrial production was achieved.

Creative ties between the scientific establishments and agricultural enterprises are becoming stronger, and new organizational forms are appearing for controlling scientific research projects and introducing their results to production. This promotes growth in the harvest yields in the fields and the productivity of animal husbandry on the farms, and successful fulfillment of plans for sale of agricultural products to the state.

At the same time it was noted at the plenum that the level of work of a number of the republic's ministries, departments, enterprises and scientific establishments on accelerating scientific and technical progress in the national economy do not meet to the fullest extent the requirements of the 26th Party Congress and the subsequent CPSU Central Committee Plenums.

Suffice it to say that the proportion of the workers occupied in manual labor in the republic as a whole is greater than 38 per cent. It is especially high in the coal and food industries, in the construction industry and in agriculture. One in every five enterprises is not fulfilling its plans for increasing labor productivity.

The way to reduce manual labor is through extensive automation of industrial processes-- use of automated machine tools, machinery and mechanisms, robot engineering complexes and computer technology. A great deal here depends on strictly carrying out the state plan for introduction of the achievements of science and technology. However, in a number of ministries, departments and enterprises these important tasks are not being carried out. They are systematically frustrated by the ministries of the construction material industry, agriculture, fruit and vegetable industry, construction, trade, and domestic services. Economic administrators, party and trade union organizations must take special control over fulfillment of plans for new equipment, for utilizing the existing automated equipment and reducing manual labor.

More scientists, engineers, and specialists in the design and technological services must become involved in this work. It would be proper to expand the practice of organizing temporary scientific-production units at the associations and enterprises to solve specific scientific-technical tasks.

Raising the quality of production remains a serious problem. Each year the trade organizations reject up to 15 per cent of the shoes, fabrics, clothing and knitted wares, and other consumer goods produced in the republic, which have passed inspection. And this is why it is necessary to activate universal introduction of integrated systems for production quality control. The party committees, soviet and economic authorities must implement control of their development and improvement.

Successful implementation of the Food Program, it was pointed out at the CPKi Central Committee Plenum, is not possible without persistent introduction of the achievements of scientific and technical progress and progressive production experience. However, the capabilities of the republic's scientific institutes are still not being fully utilized to develop the branches of the agro-industrial complex. There are quite a few shortcomings in solving the problems of animal feeds, and in the condition of veterinary services. There is much to be done in order to speed up working out intensive methods of development of sheep breeding.

One of the most important scientific and technical problems is working out an essentially new zonal system for the introduction of irrigation farming for various mountainous regions of the republic, as well as extensive introduction of automated control systems for water distribution.

The plenum stressed the special significance of working out a scientific basis for the efficient overall utilization of the agro-economic potential--that is, the land and the productive assets, labor and natural resources both in the republic as a whole as well as in its separate regions. Only on this basis is it possible to take advantage of rational specialization and concentration of production, reduction of low-productivity manual labor and optimization of industrial processes in agriculture. A significant amount of reconstruction on a modern scientific-technical basis should be undertaken in all branches of the agroindustrial complex in order that the agricultural raw materials are completely processed on the spot. The plenum set the task for overall mechanization and automatation in the food and the meat and dairy industries.

Quite a few pressing problems await solution in capital construction. These are: improving planning for overall introduction of science and technology in the construction industry, broad utilization of effective construction materials and small power tools, perfecting forms of organization of labor and raising its productivity. Party organizations should increase the responsibilities of the administrators, specialists, and labor collectives in order that the branch can be brought to the forefront of scientific technical progress.

While solving today's problems, one must devote maximum attention to the problems of the future as well. It is above all a question of working out the scientific basis and the way to further economic and social development of the republic, for intensifying its specialization on the scale of the national economy of the country; and a question of comprehensive and rational assimilation of natural raw-material and mineral resources.

There are still acute problems in putting into production unused reserves of antimony ores, in developing deposits of nonferrous metals, granite and marble; in speeding up the development of a special-purpose program for powder metallurgy; and in developing and improving the republic's fuel and power engineering complex.

Solving the socio-economic problems requires steady improvement in the level of planning, coordination and management of scientific research projects, and introducing their results to production. The state of this work at Gosplan, at the Academy of Sciences, in the ministries and departments, and at branch scientific research institutes requires fundamental improvement.

Practical experience shows that where party committees direct cooperation between scientists and producers in a businesslike manner the greatest effect is achieved in utilizing the latest achievements of science, technology and progressive experience. For party committees to become occupied with problems of scientific-technical progress they must first of all deal with the people who work in this sphere, and must conduct educational work among the scientific and technical intelligentsiya. It is no secret that at certain enterprises and other organizations engineers have been changed into clerks, into paper-pushers and writers, into "pushers"--into persons who carry out other responsibilities, frequently requiring neither an engineering education, nor its corresponding skills. This has a dampening effect on the personnel, and reduces their responsibilities for the work sector entrusted to them. The engineering and technical intelligentsiya, the specialists of the national economy, are the primary conduits for scientific and technical progress. Ensuring that they are used effectively is the direct responsibility of the economic administrators and the party organizations.

In order to accelerate scientific-technical progress it is necessary to expand the role and increase the responsibility of the local Soviets of Workers' Deputies, people's control authorities, trade union and Komsomol organizations, mass information and propaganda media, and the system of economic education of the workers.

The CPKi Central Committee Plenum approved specific measures for increasing the rates and the scale of introducing to the national economy the achievements of science, technology and progressive experience, which will promote intensification of the economy by all means possible. Party, soviet and economic organs, scientific establishments and labor collectives are summoned to guarantee unconditional fulfillment of the plans.

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## REPORT ON ANNUAL MEETING OF ARMENIAN ACADEMY OF SCIENCES

Yerevan KOMMUNIST in Russian 31 May 84 p 3

[Armenpress report on annual general meeting of Armenian SSR Academy of Sciences held 30 March, place not specified: "On the Front Lines of the Five-Year Plan--Annual General Meeting of the Armenian SSR Academy of Sciences"]

[Text] In the decisions of the 26th CPSU Congress and subsequent plenums, a very important place was given to the scientific-technical progress of the entire national-economic complex. An appreciable contribution to its realization is being made by scientists of Armenia. A businesslike discussion on the successes achieved in this field and the tasks and problems of future development of science developed at the annual general meeting of the Armenian SSR held 30 March.

Comrades K. Demirchyan, B. Sarkisov, F. Sarkisyan, K. Dallakyan, L. Nersesyan, deputy chairmen of the Armenian SSR Council of Ministers G. Sagoyan and Yu. Khodzhamiryan participated in the Academy's general meeting. Prior to the start of the meeting, they familiarized themselves with an exhibit of scientific developments of institutes and other scientific institutions of the Armenian SSR Academy of Sciences shown in the foyer of the presidium of the Academy of Sciences.

The meeting was opened with introductory remarks by the president of the Armenian SSR Academy of Science V. Ambartsumyan.

The reporting period, he said, was marked by important events for our country. Thanks to a number of measures undertaken by the Communist Party and the Soviet government, the national economy's rate of development was accelerated. New steps were taken along the path of scientific-technical progress in the economy. At the February (1984) Plenum of the CPPSU Central Committee, General Secretary of the CPSU Central Committee, K.U. Chernenko, speaking of current tasks, noted that intensification and accelerated introduction of the achievements of science and technology into production should raise the productive forces of our society to a qualitatively new level. This basic direction, advanced by the party, imposes major obligations on Soviet science and, naturally, on the scientific collectives of our republic.

The results of scientific achievements in the Soviet Union were summarized at the recently held annual general meeting of the USSR Academy of Sciences. In his introductory remarks, the president of the Academy, Academician A.P. Aleksandrov emphasized that in Armenia development of physics is proceeding intensively. Actually, a rather large scientific potential has been created in this sphere at the institutes of the Academy and subordinate institutes. At the same time, it should be noted that today the republic as a whole and its multisectorial industry are only beginning to duly feel the effect of this potential. In order to achieve successes, it is necessary to improve the training of young personnel, utilizing for this purpose the VUZ resources both of Yerevan and other of the republic's cities and to expand the network of special design buros and experimental production facilities. And only in this case, the Academy's president emphasized, would physics exert a major impact on scientific-technical progress.

Further on, V. Ambartsumyan dwelt on the fundamental results obtained at institutions of the Academy. He evaluated their activities and outlined tasks of collectives in the light of present-day requirements. An important task, he said, is rapid introduction of the achievements of science in the national economy. In recent years a great deal has been done in this area, but we must not remain satisfied with what has been achieved when we consider the organizational side, which frequently hinders fast introduction of scientific developments. It is necessary to emphasize that union ministries show a great interest in scientific developments of our institutes, try to use them and with their funds organize special units that operate under the guidance of the institutes of our Academy or in close cooperation with them. Unfortunately, the same thing cannot be said about some of the republic's ministries and departments.

Devoting a great deal of attention to the applied side of scientific research, the Academy of Sciences directs its basic resources to the study of fundamental problems. In speaking of this, Academician V. Ambartsumyan noted that technical progress is determined by the development of the basic sciences. Herein lies the inestimable role of mathematics, computer technology, physics, microbiology and other branches of contemporary science. Effectiveness of the work of scientists and scientific collectives as a whole V. Ambartsumyan said in conclusion is to a considerable degree determined by the initiative of every scientist and a creative approach to the set task. He expressed confidence that scientific collectives of the republic's Academy of Sciences will revise their work in the spirit of the new requirements of the party and direct it to the solution of problems of contemporary scientific-technical progress.

Academician-Secretary of the Academy, Academician of the republic's Academy of Sciences G. Galoyan presented a report on the basic results of the scientific and scientific-organizational work of the Armenian SSR Academy of Sciences in 1983.

The reporting year, he said, was filled with major events. At the July and December (1983) and February (1984) plenums of the CPSU Central Committee, questions were discussed that are of vital importance to our people and party and on whose undeviating fulfillment the further social-economic progress of our country depends. The decisions of these plenums in which the directives

of the 26th CPSU Congress on integration of science and production were developed are for us a guide to action. Today it can be said that in our Academy's institutes, as throughout the entire country, palpable results have been achieved. State and labor discipline has been strengthened; together with the development of the basic sciences a number of tasks of national-economic significance have been solved.

Measures of major importance to the further improvement of scientific and organizational work of the Armenian SSR Academy of Sciences were outlined in the decrees of the Central Committee of the Communist Party of Armenia adopted in 1983 and in the reports of the first secretary of the Central Committee Comrade K.S. Demirchyan at plenums of the Central Committee of the Communist Party of Armenia and dealt with questions of increasing the effectiveness of scientific-research work, acceleration of introduction of achievements of science into production, development of physico-chemical biology and biotechnology and training of scientific personnel in the republic.

Touching on the work of the presidium of the Academy of Sciences, the speaker noted that at the center of its attention was the problem of further development of basic scientific directions at the Academy's institutes. The presidium has regularly studied questions of coordination of scientific work and strengthening of ties of scientific-research institutions and VUZ's of the republic and implemented concrete measures for improving scientific and scientific and organizational work of the Academy's institutes.

In 1983, scientific-research work was conducted at the institutions of the Academy on 151 problems, which take in 405 themes, including 295 on the natural sciences and 109 on social sciences. Sixty-two themes specified by the plan have been completed. The institutes did considerable work on bringing their activities into accord with present requirements.

A number of practical steps were taken in the reporting year on ensuring scientific-technical progress and introduced achievements of science into the national economy. The presidium examined these questions and made pertinent proposals to the republic's directive organizations. In the approved plan of measures, several tens of proposals were included. A part of them has already been introduced into production.

The interests of tomorrow demandingly require of all our scientific-research organizations that they make a radical change in the training of young scientific personnel. But serious lapses exist here. The fact is that the average age of scientific youth is rather high. With the cooperation of the council on training of scientific personnel, the presidium of the Academy, the council of young scientists and specialists of the Armenian Komsomol Central Committee and the council of young scientists of the Academy, the presidium discussed the question "On Improving Work with the Youth at Scientific Institutions of the Armenian SSR Academy of Sciences." For the purpose of stimulating the scientific work of young scientists, 6 prizes and prize-winner certificates were established which will be awarded once every 2 years. From now on one of the important appraisal criteria of the work of institutes will be the research results of young scientists.

In the stage of developed socialism, our party attaches great importance to the further development of the social sciences. On the whole, the chief task is to have social-scientific thought most actively serve the development of the scientific bases of the policy of the Communist Party in present-day conditions and the selection of effective directions of the country's economic and social development. The recently adopted decree of the CPSU Central Committee "On Enhancing the Role of the Institute of Economics of the USSR Academy of Sciences in the Development of Key Questions of Economic Theory of Developed Socialism" is of great importance for all social-scientific institutes. It should be noted that we are still lagging in the development of economic, social and legal questions of scientific-technical progress. There still has not been created an extremely necessary methodology of calculating the economic effectiveness of developments proposed for introduction into the national economy.

The speaker dwelt on the work of scientific councils attached to the presidium of the Academy of Sciences, analyzed the work of the patent service, spoke of significant changes in this sphere and pointed out the major attention paid to increasing the productivity of scientific study tours.

Achievements could be more significant if a high feeling of responsibility for execution of decisions were to be manifested in all parts of the Academy. The presidium plans to examine more frequently this year progress of fulfillment of adopted decisions for the purpose of increasing the personal responsibility of heads of all institutes and other scientific units of the Academy of Sciences. The slogan produced at the February (1984) Plenum of the CPSU Central Committee--the new five-year plan has to be the five-year plan of a decisive break in the intensification of all sectors of our national economy --obliges scientific personnel to improve work style and methods, to locate unutilized reserves, to ensure intensive development of all branches of science and to see to it that science actually becomes an integral part of the mechanism of management.

In the name of the participants of the meeting, G. Galoyan assured the Central Committee of the Communist Party of Armenia and the republic's government that the presidium of the Academy of Sciences and the collectives of the Academy direct all their energies at undeviating implementation of the tasks set before science by the party.

A discussion developed on the report. Persons who spoke were Academician of the Armenian SSR Academy of Sciences S. Vartanyan, the chairman of the USSR State Committee for Utilization of Atomic Energy A. Petrosyants, Academicians of the Armenian SSR Academy of Sciences A. Gabrielyan, B. Arakelyan, S. Yeremyan, Minister of Foreign Affairs of Armenian SSR, Doctor of Historical Sciences Dzh. Dirakosyan, corresponding member of the Armenian SSR Academy of Sciences L. Dzhanpoladyan and Doctor of Technical Sciences, G. Bagramyan.

Vice President of the Armenian SSR Academy of Sciences A. Iosifyan presented a scientific report "On Certain Problems of Electrification of Agriculture" in the light of realization of the USSR Food Program. He spoke of intensifying scientific work in the field of the economy and organization of agroindustrial

production, genetics and breeding of plants and animals, fodder production and improvement and creation of new means of mechanizations of production processes, new technology and rational utilization of the republic's land resources.

The speaker pointed out the need of increasing research in the field of genetic engineering and creating new effective means of protecting plants from pests, diseases and weeds.

He dwelt on electrification in the area of field cultivation, animal husbandry, creation of electrified mobile units and mechanization and electrification of animal-husbandry farm production as one of the indispensable conditions of increased productivity of agriculture and animal husbandry.

It was pointed out in the report that in the plans of scientific-technical progress of the republic to 2005, provision is made for the creation of an agroindustrial animal-husbandry complex encompassing on a single territory not only irrigation, electric plowing, electric harvesting but also the entire complex of the economy as a whole. The need was emphasized of significantly expanding work on electrification of the processes of mountain farming.

Awarding of decorations of the Armenian SSR Academy of Sciences took place.

Academician of the Armenian SSR Academy of Sciences A.A. Arakelyan received the Metsarman Gir certificate for his tireless fruitful and socially useful scientific work.

For major contributions to the development the Vastakagir certificates were awarded to corresponding members of the republic's Academy of Sciences A.A. Talalyan, K.A. Kostanyan, G.I. Ter-Stepanyan, Doctor of Biological Sciences L.A. Matinyan, Doctor of Hisstoric Sciences O.G. Indzhikyan, Doctor of Economic Sciences N.R. Tovmasyan, Doctors of Philological Sciences N.A. Parnasyan and A.G. Zakharyan. A large group of scientists was awarded the Govestagir certificate for successful scientific-research work.

Elections were held for the presidency of the Armenian SSR Academy of Sciences. The outstanding scientist Twice Hero of Socialist Labor Academician V.A. Am-bartsumyan was again elected president.

Academician of the Armenian SSR Academy of Sciences A.A. Gabriyelyan was elected academician-secretary of the Division of Earth Sciences.

Elections were held for honorary members of the Armenian SSR Academy of Sciences. Those so chosen were President of the USSR Academy of Sciences Thrice Hero of Socialist Labor Academician A.P. Aleksandrov, Vice President of the USSR Academy of Sciences Hero of Socialist Labor Academician P.N. Fedoseyev, Twice Hero of Socialist Labor Academician-Secretary of the Division of Mathematics of the USSR Academy of Sciences Academician N.N. Bogolyubov.

On this, the annual general meeting of the Armenian SSR Academy of Sciences completed its work.

## REPORT ON ANNUAL MEETING OF ESTONIAN ACADEMY OF SCIENCES

Tallinn SOVETSKAYA ESTONIYA in Russian 5 Apr 84 p 3

[ETA report on 38th annual meeting of Estonian SSR Academy of Sciences held 4 April in Tallinn: "A Broad Spectrum of Research--From the Annual Meeting of the ESSR Academy of Sciences"]

[Text] The 38th annual meeting of the Estonian SSR Academy of Sciences was held 4 April in Tallinn. It took place in an atmosphere of businesslike discussion of the results of the scientific work of the republic's scientists and of the tasks that will have to be solved for accelerated progress of Soviet science and development of the national economy.

The past year for scientists of the republic's Academy of Sciences, as for all the people, the president of the ESSR Academy of Sciences, corresponding member of the USSR Academy of Sciences K. Rebane said, was marked by new achievements in implementation of the decisions of the 26th CPSU Congress and subsequent plenums of the CPSU Central Committee. The plan of scientific-research and experimental work as well as the socialist commitments of the collective of the ESSR Academy of Sciences were successfully fulfilled.

The ESSR Academy of Sciences together with the academies of the country's fraternal republics and the USSR Academy of Sciences actively participated in carrying out very important scientific-technical programs. These working ties are becoming increasingly strengthened and are becoming more fruitful.

The party and the government are directing scientists to boost the effectiveness of scientific research and to introduce as quickly as possible their results into the practical work of socialist construction. For this the presidium of the ESSR Academy of Sciences directs the work of the Academy and its scientific subdivisions toward improvement and intensification of scientific-research activity and experimental work and is concerned with expanding the material base necessary for this and improving the working and living conditions of the scientists.

Academics-secretaries Ya. Eynasto, A. Raukas and Yu. Kakhk gave a survey of the work of the divisions of the ESSR Academy of Sciences in 1983.

The chief secretary of the presidium of the ESSR Academy of Sciences corresponding member of the ESSR Academy of Sciences R. Khagelberg presented a report on the work of the ESSR Academy of Sciences in 1983 and the plan of scientific-research work for 1984.

The scientific work of the Academy comprised 98 major problems, including 256 scientific themes. Working out of 31 themes was completed. In the reporting period, 33 proposals based on the results of completed research were turned over for introduction into the economy. Institutions of the Academy submitted more than 40 claims for inventions, while 19 inventions of Estonian scientists were adopted in practical work.

The work of many scientists of our Academy in 1983 was highly rated. Staff member of the Institute of Cybernetics of the ESSR Academy of Sciences T. Arak was awarded the Prize imeni A.A. Markov of the USSR Academy of Sciences for outstanding results in the field of probability theory. A whole series of scientists was awarded orders and medals.

Subsequently the speaker characterized the most promising and important to science and the economy research conducted at the ESSR Academy of Sciences. At the Institute of Astrophysics and Atmospheric Physics, new methods of analysis of the structure of the Universe and detailed investigation of super-clusters of galaxies determined the basic elements of the large-size structure of galaxies. Theoretical conclusions were made with respect to hidden mass, the carriers of which could be both massive neutrinos and particles of the type of axions or gravitinos. Work on the basis of determination of the optical properties of vegetative cover is being conducted on remote forecasting of the yield of agricultural fields.

A method of recording and reproducing a light signal, opening up new perspectives for the use of lasers in computer technology, has been proposed and experimentally carried at the Institute of Physics.

Researches on solid-state structures involving the use of the promising method of nuclear magnetic resonance spectrometry are being successfully conducted at the Institute of Chemical and Biological Physics. Here monoclonal antibodies have already been obtained for the diagnosis of potato viruses.

At the Institute of Cybernetics, a universal system has been created making possible the carrying on of a man-machine dialog in different fields of application of electrono-computer technology in science and the national economy.

Work in the field of power engineering conducted at the Institute of Thermo-physics and Electrophysics is of scientific and practical importance.

Significant achievements have been made by chemists in investigating the synthesis of prostaglandins and biotechnology. At the Institute of Chemistry, detergents were developed for the electronic industry.

Work at the Institutes of Geology, Zoology and Botany and Experimental Biology as well as at the Tallinn Botanical Garden has been directed at the solution of many problems included in the food program, programs of protection of the environment and rational use of earth reserves and water resources.

Work of special significance has been conducted by the Division of Social Sciences of the ESSR Academy of Sciences in the light of the decisions of the June (1983) Plenum of the CPSU Central Committee where the necessity of intensifying researches of scientists and social scientists for increasing the effectiveness of the national economy, developing scientifically based recommendations for improving political-educational work, further strengthening Soviet society and generalizing the experience of international traditions and social and cultural achievements was underscored.

At the Institute of Economics, a forecast was developed of disposition of productive forces and social-economic development of the republic to the year 2000, a complex program of scientific-technical progress of Estonian SSR was compiled for 1986-2005 and programs on automation of processing of economic information were developed and introduced into the republic's industry.

Work was completed at the Institute of History on historico-sociological investigation of the forming, ideological education and the social-professional structure of the creative intelligentsia of Soviet Estonia. Monographs are being written on the history of the working class and peasantry of the ESSR.

At the Institute of Language and Literature, Estonian literature was comprehensively investigated in the monograph "Estonian Soviet Literature and Forms of International Literary Communality" in the light of the theory of interliterary common factors with tracing of different forms and levels of interliterary integration. A research study was completed in which the theoretical bases of compiling special phraseological dictionaries and other works were compiled on material of the Russian and Estonian languages.

Description of the results of scientific research shows that the republic's scholars have devoted their chief attention to all-union and republic complex programs and accelerated introduction of their practical results into the national economy. Institutions of the ESSR Academy of Sciences continued to work out tens of republic complex programs. But much still has to be done for greater concentrations of forces and resources on the basic directions.

Utilization of the results of scientific research in the national economy is of major importance in the work of the ESSR Academy of Sciences.

The most important proposals of the Academy for work realization in the national economy include creation of a device for cleaning inert gases introduced in the Institute of Atomic Energy imeni I. Kurchatov; new laser spectrometers and other analytical instruments and apparatuses devised by the scientists and designers of the ESSR Academy of Sciences for different scientific-research institutes of the country, agents for protection of plants against insects and pests for agriculture which are being successfully employed in many regions of the Soviet union; recommendations for the conservation and increase of stocks of valuable fish in Lakes Vyrts"yary and Pskovsko-Chudskoye; programs for computer centers of the ESSR agroindustrial complex for improving the breed herd on the republic's farms and many others.

The speaker dwelt on strengthening the material base of the ESSR Academy of Sciences--during the reporting year a laboratory building of the Institute of Geology and Botany in Tartu and a number of other facilities became operational. But the plan of construction work remained uncompleted.

Publishing activity of the Academy was carried out successfully in the reporting year--more than 150 books, brochures and journals were put out with the efforts of the ESSR Academy of Sciences.

This year the Academy's collective will work on 95 current problems, unifying 251 themes. Characteristically the current year's plan provides for turning over into practice about 40 proposals made on the basis of completed scientific developments. Results from their introduction into the national economy will amount to millions of rubles.

Conferring of awards was made--medals of the USSR Exhibition of National Economic Achievements. Certificates to corresponding members of the ESSR Academy of Sciences and diplomas to doctors of sciences were also awarded.

The work of the annual meeting of the ESSR Academy of Sciences involved the participation of members of the Buro of the Central Committee of the Communist Party of Estonia Chairman of the Presidium of the ESSR Supreme Soviet A. Ryutel, Chairman of the ESSR Council of Ministers B. Saul, chief of the Department of Science and Educational Institutions of the Central Committee of the Communist Party of Estonia A. Aben and ESSR Ministers I. Nuut and V. Ryatsep.

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## REPORT ON ANNUAL MEETING OF KIRGHIZ ACADEMY OF SCIENCES

Frunze SOVETSKAYA KIRGIZIYA in Russian 1 Apr 84 p 3

[KirTAG report on annual general meeting of the Kirghiz SSR Academy of Sciences held 29 March in Frunze: "Strengthen the Union of Science and Production--Annual General Meeting of Kirghiz SSR Academy of Sciences"]

[Text] The accelerated introduction into production of achievements of science and technology and implementation of large-scale complex programs, it was pointed out at the February (1984) Plenum of the CPSU Central Committee, should raise the productive forces of our society to a qualitatively new level. In an appearance before voters, General Secretary of the CPSU Central Committee Comrade K.U. Chernenko stressed the need of providing rapid and continuous renewal of all sectors of the national economy of present achievements of science and technology.

At the annual general meeting of the Kirghiz SSR Academy of Sciences held 29 March in Frunze there was talk of how the scientists of Kirghizia contribute to the solution of this important task of Soviet science.

In his introductory remarks the president of Kirghiz SSR Academy of Sciences corresponding member of the USSR Academy of Sciences M.I. Imanaliyev spoke of the achievements of research collectives of the leader of Kirghiz science in the past year.

Acting chief academic secretary of the presidium of the Kirghiz SSR Academy of Sciences P.I. Chalov presented a report on the results of the work of the republic's Academy of Sciences in 1983.

It was pointed out at the meeting that institutions of the Kirghiz SSR Academy of Sciences completely fulfilled the 1983 plan of scientific-research work. The national economy adopted 60 proposals with a total economic effect of more than 18 million rubles.

In the third year of the 11th Five-Year Plan, the Academy's scientists carried out research on 156 themes in the field of the natural and social sciences as well as work on 44 assignments and 14 programs relating to the solution of very important scientific-technical problems. Seventy-five themes were completed on economic contracts with enterprises, industry and agriculture for a sum of about 2 million rubles.

New important scientific results were obtained in explorations for mineral deposits that are of primary importance to the further development of the mineral-raw material base of the republic. Scientific developments are being conducted on a broad front for the accomplishment of a long-term economic program for the integrated use of mineral, land, water and power resources in Issyk-Kul Oblast and in areas of Chu Valley.

Research is being expanded in the field of open working of coal deposits, on effective use of mechanized coal complexes in mines with complex stratifications of coal and on improving the technology of excavating coal, polymetallic ores and nonmetallic materials.

Scientific researches on mining machine study are of importance to the development of the mining industry and geological prospecting. Scientists are successfully solving a complex of problems connected with boosting quality, reliability and productivity of drilling machines and reducing their materials intensiveness and power consumption.

Scientific institutions of the republic's Academy are conducting fruitful research in the field of building automated control systems for technological processes and production quality which are already being used at a number of enterprises of the republic's Ministry of Construction and Ministry of Construction Materials Industry.

The scientific developments of the Kirghiz Academy of Sciences are playing a definite role in the development of nonferrous metallurgy and certain sectors of the chemical industry.

In conducting research work in the field of chemistry, considerable attention is being devoted to the development of small-scale sectors of the chemical-pharmaceutical and microbiological industry. A significant place is given to the solution of problems of microbiological synthesis of amino acids found in fodder.

Scientists of the republic's Academy of Sciences are also making a major contribution to the realization of the country's food program. One of the chief objectives is creation of a solid and reliable fodder base for animal husbandry.

It was pointed out at the meeting that the decree of the CPSU Central Committee "On Increasing the Role of the Institute of Economics of the USSR Academy of Sciences in Working Out of Key Questions of Economic Theory of Developed Socialism" constitutes a long-term program of intensification of development for economic science. It sets forth first-priority tasks not only for economic but also for other scientific institutions. In particular, the scientists of our republic will have to study more deeply key questions of boosting the efficiency of industrial and agricultural production of Kirghizia and the intensive type of expanded reproduction and radical boosting of labor productivity as well as theoretical problems of scientific-technical progress.

Last year the Institute of Economics of the republic's Academy did a great deal of work on compiling a complex program of scientific-technical progress for Kirghiz SSR for 1986-2005. Such work was carried out in the republic for the first time.

Staff members of the institutes studied problems of vocational orientation of school children and allocation of young people to production in Frunze and the basic directions of economic and social development of Leninskiy Rayon of the republic's capital to 1990.

Staff members of the Institute of History are fruitfully working on the publication of a five-volume "History of Kirghiz SSR" and are preparing for publication a six-volume "Compilation of Memorials of History and Culture of Kirghizstan."

At the Institute of Language and Literature, work has been completed on the first volume of a two-volume "History of Kirghiz Soviet Literature," generalizing its development from the time of its inception to 1980. The first volume has been prepared and turned over to the press of a two-volume Explanatory Dictionary of the Kirghiz Language. The first volume of a four-volume academic publication of the epic "Manas" in the Kirghiz and Russian languages has been prepared for publication at "Nauka" Publishing House in Moscow jointly with the Institute of World Literature of the USSR Academy of Sciences.

A significant place in researches conducted by scientists of the Institute of Philosophy and Law is occupied by laws of development of the socialist way of life of Soviet people and the impact of spiritual culture on the way of life of Soviet society.

Defects were also pointed out at the meeting in the work of a number of the Academy's scientific institutions. The subject matter of the researches of some of them is weakly related to actual questions of science, economics and culture. At the same time, many institutes are only making a formal shift to the realization of very important complex scientific-technical programs of union or republic importance. They do not transfer to this subject matter leading scientific forces and resources. Thus, up to now less than 20 percent of the staff of the Academy's scientific workers have taken part in the fulfillment of goal-oriented and complex programs, including such pressing ones as the food program, the program on the Issyk-Kul-Chu Regional Production Complex and development of high mountain areas.

The meeting's participants outlined ways of furthering increasing effectiveness of research, speeding up the introduction of scientific developments into the economy and eliminating existing defects.

At the meeting, corrections were adopted to the Charter of the Kirghiz SSR Academy of Sciences.

The scientists listened to a number of scientific reports on pertinent problems of scientific-technical progress.

Deputy Chairman of the Kirghiz SSR Council of Ministers Dzh.Ch. Tashibekov and the chief of the Department of Science and Educational Institutions of the Central Committee of the Communist Party of Kirghizia R.E. Sadykov took part in the work of the annual general meeting of the republic's Academy of Sciences.

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## REPORT ON ANNUAL MEETING OF MOLDAVIAN ACADEMY OF SCIENCES

Kishinev SOVETSKAYA MOLDAVIYA in Russian 31 May 84 p 3

[Report by ATEM correspondent R. Khomenko on general annual meeting of the Moldavian SSR Academy of Sciences held 30 March in Kishinev: "Science--Reserve of Production Intensification"]

[Text] General Secretary of the CPSU Central Committee Comrade K.U. Chernenko named as one of the key tasks of the day rapid and continuous renewal of all sectors of the national economy on the basis of present achievements of science and technology. At the general annual meeting of the Moldavian SSR Academy of Sciences held 30 March in Kishinev talk dealt with how better to realize the potential perspectives of science and to multiply its contribution to intensification of production.

The realization of these high-priority tasks set by the party imperatively requires bolstering the effectiveness of basic and sectorial science, further strengthening of ties of scientists with production, quicker and wider utilization of the achievements of scientific-technical progress in the national economy. Emphasizing this in his introductory remarks, the president of the republic's Academy of Sciences corresponding member of the USSR Academy of Sciences A.A. Zhuchenko pointed out that the efforts of scientists of the Academy last year were concentrated on the solution of current tasks of scientific-technical progress in different sectors of the economy and culture. Research on 163 themes was conducted on a broad front, encompassing numerous fields of knowledge. About 150 completed works with an annual economic effect in excess of 87 million rubles were introduced into the national economy.

Speaking of the tasks of scientific collectives, the president of the republic's Academy of Sciences pointed out the need of expanding the scale of introduction of the most significant developments, increasing their emergence in the sector and closer tying in planning of researches for the coming year and subsequent five-year plans with the plan for future development of the republic's economy.

D.V. Gitsu, the chief academic secretary of the presidium of the MSSR Academy of Sciences, presented a report on the work of the Moldavian SSR Academy of Sciences in 1983. The Academy's work in the reporting year, he said, was aimed at further increasing the basic character and effectiveness of research,

the effectiveness and pertinency of practical developments and maximal increase of payback to the national economy of the republic and the country. Coordination of work in the field of the natural and social sciences as well as of intersectorial scientific-technical problems was improved. Collaboration with the leading scientific centers of the USSR Academy of Sciences and the Ukrainian and Belorussian Academies of Sciences became more diversified. Much was done for the further development of the material-technical and experimental base of the MSSR Academy of Sciences and automation of scientific research.

In characterizing the contribution of scientists to the national economy, the speaker noted that they completed a large volume of purposeful basic and applied research for the solution of important tasks of the republic's agro-industrial complex. Twelve of the 25 complex intersectorial scientific and technical problems, which they are working on in cooperation with collectives of VUZ's, scientific-production associations and sectorial institutes are connected to the realization of the food program. The most important of them is the creation of scientific bases of an adaptive system of managing agriculture, which ensures the independence of agricultural production from weather anomalies and helps operate it economically without disrupting natural equilibrium and employ biological resources more effectively.

Basic achievements of scientists in these fields include new methods proposed by geneticists of adaptive selection which not only accelerate the actual selection process but also make it possible to obtain highly productive plants that are resistant to ecological stresses. Systems of intensive fodder production utilizing herbicides with industrial technologies of cultivation of tilled crops are bringing in millions in income. Researches on optimizing nutrition of agricultural crops, the influence of micro- and macroelements on the quantity and quality of yield and technologies for reducing losses of products of plant growing during their transportation and storage are of practical interest. Efficiency of industrial animal husbandry will be abetted by principles of its adaptive system developed by scientists. In particular, new methods have been proposed of preventing the harmful consequences of stress and functional disturbances and increasing productivity of animals.

Among the significant works of social scientists on problems of the agroindustrial complex published are the monographs "Social-Political and Ideological Factors of Realization of the Food Program" and "The Strategy of Adaptive Intensification of Public Production." They analyze the development of the productive forces of the agroindustrial complex as a most important factor in the realization of the food program and ways of social transformation of the countryside at the present stage. Also, the strategy of multifactorial intensification of agricultural production is determined.

The report and speeches of the meeting's participants also mention tens of works in the field of the physico-technical and mathematical sciences, the results of which to a significant degree contribute to scientific-technical progress. Such are the achievements in the field of theoretical and applied mathematics, solid-state physics and solid-state electronics, study of materials, metalworking. The success was pointed out of scientists of the Academy,

Kishinev State University and Polytechnic Institute imeni S. Lazo in the production, complex research and employment of crystal and amorphous binary semiconductors, which are of major interest to optoelectronics.

The annual forum of scientists directed scientific collectives to further concentration of energies on the solution of the most important scientific tasks set by the 26th CPSU Congress and the 15th Congress of the Communist Party of Moldavia, subsequent plenums of the CPSU Central Committee and decrees of the party on questions of development of science and acceleration of scientific-technical progress. Mention was made of the necessity of orienting research on all-out economy of energy, materials, and labor and participating more actively in the development of measures for protection of nature, developing searches in the field of power engineering, ecology, geology and more actively working on problems of cybernetics, robot technology, informatics and molecular biology. A task was set to expand and deepen researches on the most urgent questions of the history of Moldavia and key problems of economic theory of the period of developed socialism, communist education of working people, criticism of bourgeois falsifiers of the history and culture of the republic.

Major attention was devoted to strengthening of ties and cooperation of scientific collectives with ministries, departments and VUZ's of the republic, more effective utilization of the experimental-production base, intensification of the actual research process and improvement of work style and methods for the purpose of increasing the payback of science to the national economy.

The following persons took part in the work of the general annual meeting of the republic's Academy of Sciences: Secretary of the Central Committee of the Communist Party of Moldavia P.P. Petrik and Deputy Chairman of the Moldavian SSR Council of Ministers N.P. Kiriyak.

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## DEVELOPMENT OF SCIENCE IN MOLDAVIA DESCRIBED

Kishinev KOMMUNIST MOLDAVII in Russian No 11, Nov 83 pp 91-93

[Review by T. Malinovskiy, academician of the Moldavian SSR Academy of Sciences, of book "Nauka Sovetskoy Moldavii" (Soviet Moldavia's Science), compiled by O.Yu. Tarasov and V.I. Uvarov, with S.I. Radautsan, academician of the Moldavian SSR Academy of Sciences, as responsible editor, Shtiintsa Publishers, Kishinev, 1982]

[Text] In the 1930s Bessarabia, which was occupied by Romania under the boyars, was visited by a correspondent for the Warsaw newspaper (KUR'YER PORANNYY). He later wrote that this was an area forgotten by God and man, that destitution and the impoverished state of the workers struck the eye there as nowhere else. The illiteracy of the rural population and its lack of knowledge doomed it to a life of vegetating in ignorance and poverty.

Amazing changes have taken place in our area, and the Moldavian people have made a gigantic leap forward in the economy, culture and other fields under socialism. Proof of this is the progress achieved in science, which is described in the book "Nauka Sovetskoya Moldavii," published by the Shtiintsa Publishers for the 60th anniversary of the founding of the USSR.

Science has achieved truly enormous successes in the republic during the years of Soviet power. We now have the Academy of Sciences and dozens of other scientific research institutions, eight VUZ's and around 9,000 scientific workers. Such important areas of modern science as theoretical mathematics and physics, quantum and bioorganic chemistry, genetics, microbiology, history, economics, philosophy, linguistics and literary criticism are being developed. We now have original schools of algebra and mathematical logic, the chemistry of coordination compounds, solid-state physics, physics and chemistry of semiconductors, agrobiology and other branches of science, which are well known both in the nation and abroad.

The assistance provided for production by our scientists is growing by the year. During the 10th five-year period, for example, Academy establishments turned over to the national economy recommendations and developments, the calculated effect from whose application exceeds 100 million rubles. A number of plants, pieces of equipment and technologies have earned world recognition and been the object of international licensing transactions.

The book describes the far-reaching changes which have occurred in recent years in research planning and in the structure of the scientific subdivisions. For example, a new system for organizing fundamental and branch science was established during the 10th five-year period. Based on the interdepartmental, comprehensive approach and the special-program principle for planning the research, it focuses the scientific capability on the resolution of large, regional national economic problems. Work is presently underway on 15 problems.

Along with important achievements in theoretical research, teams in the Department of Physico-Technical and Mathematical Sciences of the Moldavian SSR Academy of Sciences introduced 275 developments into production and received 180 certificates of invention and 24 patents during the last five-year period. The proposals include the modeling of the processes involved in planning and managing economic facilities, a series of units for electric-spark alloying and for processing products from crop cultivation (of the Plazmoliz type), a map of the seismic regions of Moldavia and the Carpathian region, and a self-compensating, high-voltage electric power line.

Research in the technical and technological fields is also conducted by more than 15 branch scientific research establishments. The work performed on the mathematical theory of casting microconductors by the Mikroprovod Scientific Production Association is well known, for example, as is that performed by Academy associates; combines produced by the Plodsel'khozmash Production Association for harvesting fruits and berries, the tomato harvester produced by the Moldsel'mash Production Association, and the sublimation method worked out by the Moldavian Scientific Research Institute of the Food Industry for canning fruits.

The biological and agricultural sciences are represented in Moldavia by dozens of Academy and branch subdivisions and scientific production associations. They work out ways to improve agricultural production on the basis of intensification, concentration and specialization. Studies performed in the fields of genetics, physiology and biochemistry of plants, microbiology, the application of chemicals in agriculture, and physiology of animals have been especially fruitful. Development of the biological principles for the adaptive system of agriculture in the contemporary situation is one of the main areas of the work. The team of scientists has come up with many new varieties of field crops, vegetables and other crops, and livestock breeds, which have been extensively introduced into production.

Studies are being actively carried out in the social sciences. They were begun back in the '20s in the Moldavian ASSR. The social scientists have published a number of fundamental works, which describe the Moldavian people's development from ancient times to the present, the founding and the rapid development of the Moldavian socialist nation, the history of the Communist Party of Moldavia, and the progress made in socialist industry, agriculture and culture. They have worked out many problems of agroindustrial integration and inter-farm cooperation. Jointly with Gosplan they have worked out a general plan for the distribution of Moldavia's production forces to the year 1990. They are studying the processes involved in the development of Soviet Moldavian literature and the modern Moldavian language, and are exposing the bourgeois falsifiers who attempt to distort the history of our region.

Moldavia's science has a considerable VUZ system. The republic's eight higher educational institutions have 140 doctors of science and professors, and more than 1,600 candidates of science and docents. They are conducting research into the most diverse subjects pertaining to the teaching and training process, as well as studies of scientific and national economic significance. In recent years, for example, they have issued more than 400 textbooks and methodological training aids, and a number of monographs and collections on current questions pertaining to the building of communism. The results of 400 projects completed at the VUZ's were applied in production during the 10th five-year period.

The book tells about the creation and the functioning of scientific institutions and schools, and about their contribution to scientific and technological progress. It describes the important role of legislative enactments having to do with the establishment of a scientific base in Moldavia and the assistance received from scientists of the RSFSR and other fraternal republics in the establishment of scientific centers and the training of personnel. Publication of the "Moldavakaya Sovetskaya Entsiklopediya" [Moldavian Soviet Encyclopedia] is graphic confirmation of the scientific and cultural achievements made by the Moldavian people during the years of Soviet power.

The series of articles acquaint the reader with the latest studies performed by the Laboratory for Semiconductor Connections of the Moldavian SSR Academy of Sciences and with the works of well-known Moldavian scientists: I.B. Bersuker, who made a discovery in the field of quantum chemistry; V.Kh. Anestiadi, under whose supervision a method was found for detecting arteriosclerosis in the early stages; M.F. Yaroshenko, who has resolved many urgent problems having to do with the aquatic fauna of the Dnestr River; with work of the Kodru, Viyerul and Yaloveny scientific production associations, a new type of scientific subdivision, to develop and introduce new varieties of fruits and grapes, and to develop higher-quality wines and modern technologies for use in orchards and vineyards.

Feature articles on certain of the republic's prominent scientists--active organizers and directors of science--are interestingly written.

Corresponding member of the USSR Academy of Sciences Ya.S. Grosul's life has taken him from rural teacher and leader of the rural Komsomol members to prominent Soviet scientist and public figure. He was one of the organizers of the republic's Academy of Sciences and its first president. He has performed extensive research, pedagogical and scientific-organizational work. He has made an important contribution to historical science with dozens of works. We see Academician of the Moldavian SSR Academy of Sciences A.V. Ablov, founder of the Moldavian school of coordination chemistry, which has gained extensive renown in our nation and abroad with the originality and innovativeness of the problems it has formulated and resolved, as an obsessed, passionate scholar and erudite teacher.

Academician of the Moldavian SSR Academy of Sciences B.R. Lazarenko, holder of the State Prize of the USSR, has done a great deal for the development of the physico-technical sciences in the republic. He has produced a number of new methods for using electricity and has developed a series of devices for working materials. The All-Union scientific and technical production journal ELEKTRONNAYA OBRABOTKA MATERIALOV was established at his initiative in the Moldavian Academy of Sciences.

Academician of the Moldavian SSR Academy of Sciences I.G. Dikusar has had an interesting life. He went to Russia for "knowledge" in the fall of 1917, where he took part in revolutionary events. He graduated from the Petrovskaya Agriculture and Forestry Academy in Moscow and became a professor. Years later he returned to his homeland to help his fellow countrymen produce large harvests and build a happy life. Through I.G. Dikusar, the Moldavian soil received the beneficial influence of D.N. Pryanishnikov, Dikusar's teacher and a leading figure in soil science.

Hero of Socialist Labor P.I. Dvornikov, academician of the Moldavian SSR Academy of Sciences and corresponding member of the All-Union Academy of Agricultural Sciences imeni F.I. Lenin, received his education in the Ukraine and went to Moldavia in order to give it his ebullient energy as a researcher, his knowledge and experience. Many new varieties of vegetables developed by him are still cultivated on republic farms and in other areas of the nation. Academician of the Moldavian SSR Academy of Sciences A.Ye. Kovarskiy, another well-known plant breeder, also studied and began his career in the Ukraine and then worked in our republic after the war. His works on the development of new varieties of corn have now become classics.

Corresponding member of the Moldavian SSR Academy of Sciences M.M. Radul has made a major contribution to the shaping of Moldavian Soviet statehood and to the organization of public education and scientific institutions in the republic. He devoted almost 40 years to the study of the economic and physical geography of his native land. He left some fundamental works, including the collective work, "Atlas Moldavskoy SSR" [Atlas of the Moldavian SSR].

The biographies of the scientists mentioned are a brilliant example of how the Soviet state develops the people's talents, which serve the people with devotion and add to their material and spiritual treasures.

The book "Nauka Sovetskoy Moldvaii" attests to the great progress made in this area thanks to the concern of the CPSU and the Soviet state and to the selfless assistance provided by all the fraternal republics. Its authors--A.A. Zhuchenko, V.A. Andrunakiyevich, M.F. Lupashku, D.T. Ursul, A.M. Lazarev and other leading scientists of the republic, journalists and writers--succeeded in thoroughly and intelligibly describing the genuine blossoming in this area of the people's spiritual culture.

The articles contained in the book are of great instructional and historical-scientific interest. They create an objective picture of the development of science in the republic and of the multifaceted work performed by our scientists for the benefit of the Soviet homeland.

By publishing this collection, the Commission on the History of Science and Technology of the Moldavian SSR Academy of Sciences and the Shtiintsa Publishers have made a good beginning in the extensive publicizing of the achievements of Moldavian scientists. We would hope that it will be continued.

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